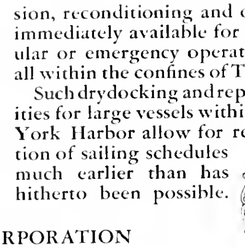
Pacific Marine Review

JANUARY 1931



Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

49% OF AMERICAN SHIPBUILDING FOR PACIFIC AMERICAN SHIPOWNERS

Pacific Marine Review, Vol. 28, No. 1, Published Monthly at 500 Sansome Street, in San Francisco, Entered as second class matter at the post office at San Francisco under the act of March 3, 1879.

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | JANUARY, 1931 | NUMBER 1

Contents

Official Organ
Pacific American Steamship Association

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Official Organ
Shipowners' Association of the Pacific Coast

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Principal Characteristics

Length	508 ft.
Beam	73 ft.
Depth	39 ft.
Displacement, tons	16,600
Deadweight, tons	7,500
Horsepower	14,000
Speed, knots	19
Consumption of fuel oil per day, tons	90
First class passengers	222
Third class passengers	64
Refrigerated cargo, tons	1000

.... New Panama Mail Liners ....

Artist's conception of the Appearance of Vessels now Building at Federal Shipbuilding & Drydock Company, Kearny, New Jersey. (Complete description of these Vessels in Shipbuilding Section of this issue of Pacific Marine Review)

Pacific Marine Review

VOLUME XXVIII JANUARY, 1931 NUMBER 1

Editorial Comment » » »

Pacific American Shipping

THAT wonderfully favored region—the Pacific Coast of the United States—is naturally a ship-minded and a ship-owning and operating center. For the first third of its history as a part of the United States it was very largely a community depending on ocean transportation for contact with its markets, domestic and foreign. During those early years it was a ship-built community and as such attracted to itself and absorbed many of the younger and more daring scions of shipowning families both from New England states and from many of the maritime nations of Western Europe.

To-day the Pacific Coast states of Washington, Oregon, and California are well up among the most important shipowning regions in the world; and as a supplier of cargoes for the world's merchant fleets this area seems to be attracting more attention than any other.

As of November 1, 1930, the American flag merchant fleet, privately owned and operated from ports of the Pacific Coast, in seagoing vessels of 500 gross tons and over, totals 575 vessels of 2,362,832 gross tons. On the same date the entire American flag privately owned seagoing merchant fleet comprised 1911 vessels, with an aggregate of 7,863,195 gross tons. The Pacific American fleet therefore contains a little over 30 per cent. of the entire privately owned merchant fleet of the United States.

It will be noted that in the tonnage and in the number of vessels the percentage of Pacific Coast owned and operated vessels is practically identical, showing that the average size of Pacific Coast owned vessels is equal to the average of the entire American fleet.

Included in this Pacific American fleet are 75 seagoing steam and motor vessels of 1000 gross tons and over inspected for passenger service. These 75 vessels have a total tonnage of 510,108 gross. The entire American fleet in this class totals 198 vessels of 1,348,731 gross tons; so that in passenger and combination liners the Pacific Coast owns and operates 34 per cent. of the American seagoing tonnage. If we eliminate the Leviathan from the totals, we find that the average size of Pacific Coast owned vessels is a little larger than that for the entire fleet in this class.

As of January 1, 1931, there are under construction in American shipyards 22 vessels of the passenger and combination liner type, aggregating about 270,000 gross tons. Of this total 9 vessels, aggregating about 133,500 gross tons are for Pacific Coast ownership and operation. Reduced to percentages, these figures show that 49 per cent. of the passenger and combination liner tonnage now building in American shipyards is on the order and under the direction of Pacific Coast shipowners. These figures are for Pacific Coast ownership only and do not include such programs as that of the United Fruit Company which has six vessels building, three of which are for exclusive Pacific Coast operation.

If we add to this seagoing Pacific American fleet the Pacific Coast ownership in vessels of from 100 to 500 gross tons and the harbor and river craft, we would bring the total well over three million gross tons, which would place the Pacific Coast shipowning and operating business about on a par with that of such maritime nations as France, Italy, Norway, and The Netherlands, and not very far behind Japan and Germany, who have somewhat over four millions gross tons each.

In addition to these Pacific Coast owned vessels, there is a vast fleet of foreign flag ships serving Pacific Coast ports in foreign trade and a considerable group of Atlantic Coast owned American flag ships serving these ports in the intercoastal trade. The question then natuarlly arises, Where is the cargo to fill all these ships?

At a recent convention of the National Rivers and Harbors Congress, Captain S. S. Sandberg, United States Shipping Board Commissioner, talked on the topic "Water-borne Traffic on the Pacific Coast an Important Factor in the Nation's Commerce." Captain Sandberg is very familiar with conditions on the Pacific Coast and presented some very interesting statistics and comparisons. The following is extracted from the published report of his address.

"The total ocean-borne trade of United States ports in 1929, both foreign and domestic, inbound and outbound combined, exceeded 316,000,000 cargo tons. Of this total 27 per cent., or over 85,000,000 tons, moved through Pacific Coast ports.

Comparison with corresponding data pertaining to 1925 discloses in that year the division of the total ocean trade was identically the same as in 1929, thus demonstrating that Pacific Coast ports are maintaining the same ratio of increase as is shown by our total ocean-borne commerce. This increase over the five year period is approximately 17½ per cent.

In the outbound traffic of 1929, foreign and domestic combined, Pacific Coast ports handled nearly 46,000,000 cargo tons, or 29 per cent. of the entire outbound ocean movement, as compared with 31 per cent. handled by Gulf ports and 40 per cent. handled by Atlantic Coast ports.

In the inbound ocean traffic of 1929, foreign and domestic combined, Pacific Coast ports handled approximately 38,500,000 tons, or 24 per cent. of the total. Atlantic Coast ports and Gulf ports handled 68 per cent. and 8 per cent., respectively, of the total inbound traffic in 1929.

During the five-year period, 1925 to 1929, the total ocean-borne foreign trade of the United States increased from 80,000,000 cargo tons to 92,000,000 cargo tons, an advance of 15 per cent.; but during this same period the Pacific Coast foreign trade increased 54 per cent., or 5,900,000 tons. In other words, 48 per cent. of the total increase in foreign trade of the United States during the five year period 1925 to 1929, was handled through Pacific Coast ports. This phenomenal advance by Pacific Coast ports was largely due to the increase in export cargo tonnage from 8,300,000 tons in 1925 to 13,600,000 tons in 1929, nearly 64 per cent. The Pacific Coast increase in import tonnage during the same period was about 25 per cent., which percentage of increase also applied to the total ocean borne import trade of the United States.

In the foreign export trade of 1929, it is noted that seven ports handled a total of nearly 30,000,000 cargo tons, or approximately 65 per cent. of the total ocean-borne export cargo movement. Two Pacific Coast ports included in this group handled more than 8,500,000 tons of export cargoes, or 29 per cent. of the total, while the five Atlantic and Gulf ports handled 36 per cent.

Further, it is noted that twenty-one leading ports in foreign trade handled exports aggregating 46,000,000 tons, or more than 98 per cent. of the total, while five Pacific Coast ports alone handled approximately 25 per cent. of the total.

The strategic position of the Pacific Coast with those great potential markets in the Orient and South America and the constantly increasing traffic between the Pacific Coast and Europe holds forth exceptional opportunities."

It would seem, from these figures, that the progress of shipowning on the Pacific Coast is keeping pace with the development of water-borne traffic at Pacific Coast ports and that, notwithstanding present depression, Pacific Coast shipowners are to be congratulated on their far-sighted vision in acquiring good tonnage for future expansion.

Another matter wherein Pacific American shipowners are to be congratulated is their demonstrated ability to cooperate with each other in developing certain phases of the shipping business wherein common action is necessary. The united action of the two Pacific Coast shipowning associations at Washington during the past five years has been responsible, more than any other single factor, in bringing about the present favorable attitude of Congress to the American merchant marine.

The coastwise cooperative work of the Safety Department of these associations is the most extensive and most impressive effort of its kind ever undertaken in the history of the world's shipping and is being made a model for similar work in other districts of the United States and in other maritime nations.

For all of these reasons, and many others too numerous to mention, we feel confident as we face 1931—confident as we express our New Year Wish for prosperity and happiness to all Pacific American Shipowners—that they will find very definite improvement in 1931 and an increasing measure of complete return to normal in the years to follow.

And we urge all ship-minded citizens who are interested in the growth of the American merchant marine to keep their eyes on Pacific Coast Developments

American Shipping in Foreign Trade

THE American ship, privately owned and operated, is in foreign trade; and, backed by the sentiment of the people and the sympathy and financial support of the Congress of the United States, she has every intention of staying on the job. We were therefore not a little surprised to note the following in a release describing the annual report of the Commissioner of Navigation: "Statistics cited in Commissioner Tyrer's report strikingly reveal the decline of American tonnage engaged in Foreign Trade since the high water mark reached in 1921. On June 1, of the current year (1930) this tonnage amounted to only 3,319,000, a falling off of 7,480,000 gross tons."

These figures, to anyone familiar with the facts, are obviously in error and were subsequently corrected with an errata slip; so that, so far as the report is concerned, those to whom that document was mailed have the correction available. However, the figures given in the release were published by the press; and this particular item was prominently head-lined in many important dailies.

The true figures show that on June 30, 1921, there were 2559 American vessels with an aggregate gross of 10,620,717 tons engaged in foreign trade. On June 1, 1930, there were 1159 American flag vessels with an aggregate gross of 5,219,558 engaged in foreign trade, showing a falling off of 5,400,000 gross tons.

Again, those who are familiar with the facts as they are to-day and as they were in 1921 will see that even this modified statement makes an unfair comparison.

1921 was a year of intense Shipping Board activity in foreign trade. The total tonnage of cargoes in United States foreign trade, exclusive of Great Lakes, was in round figures 80 million tons in the calendar year of 1921. In the calendar year of 1929 (latest available) it was 107 million tons.

In 1921 American vessels carried 51 per cent. of the tonnage, or 40,800,000 tons. In 1929 American ships carried 40 per cent. of the tonnage, or 42,800,000 tons. In other words, American ships in 1929 carried 5 per cent. more cargo than in 1921, with 50 per cent less tonnage.

Such an achievement should be called an increase in transportation efficiency rather than a "decline in American tonnage engaged in foreign trade."

A New White Flyer

AT NOON on January 9 a gigantic snow-white liner, new and yet strangely familiar, will clear from Pier 32, San Francisco, and head for the Golden Gate. This new white steamer will be the steamship Malolo, proud flagship of the Matson fleet.

Through the process of sand blasting, the old coating was taken off, and with it all of the scales and rust that accumulate under a ship's paint. The new coat of white was built up from the clean steel surface of the hull, and a dash of contrasting color effected by boot topping the ship in green.

In her new colors, the famous "Flying Fish" will stand out as one of the handsomest ships on the Pacific and will compare favorably with the long graceful greyhounds that ply the North Atlantic.

On her first voyage in the new year, the Malolo will sail from San Francisco January 9 en route to Honolulu via Los Angeles. She will sail from the southern California port January 10. From Honolulu the Malolo will return direct to San Francisco and remain in the San Francisco-Honolulu service until the boat train schedules have been consummated, after which she will begin an "open jaw" service with alternate calls at Los Angeles harbor and San Francisco.

Sailing Ship History

MANY of our readers are deeply interested in accurate historical data on American Sailing Ships. We are therefore glad to announce the publication of two excellent books, each of which is the result of life-long personal research in this rather difficult field. The halo of romance and the aura of wild adventure have too often been allowed to obscure real data and important facts when authors are dealing with sailing ships, and particularly with American clipper ships. Here are two books that are full of authentic sailing ship history.

AMERICAN MERCHANT SHIPS, 1850-1900. By Frederick C. Matthews. 415 (7x10) pages, printed with 12-point Caslon type on Warran's Olde Style wove paper. 126 illustrations and a frontispiece in color. Strongly bound in dark blue linen. Publication No. 21 of The Marine Research Society, Salem, Massachusetts. Price $7.50 postpaid.

This is, in our judgment, the most important contribution to sailing ship literature since the publication of "American Clipper Ships" by Howe and Matthews. The present volume supplements and further completes the history of the later American clippers and the American sailing ships that followed them. It gives the life history of each ship, when and where built, dimensions, accounts of all recorded vessels, with exact information on all fast passages, disasters, shipwrecks, and other matters of interest.

This volume represents a large part of the life work of a "San Francisco man engaged in the shipping trade." A considerable portion of the contents were gathered contemporaneously with the events they describe. No one who is acquainted with Mr. Matthews needs to be assured that the text and illustrations have been put through a most rigorous process of "check and double check." The half-tone illustrations, many of them made from rare and costly photographs and paintings, are printed on calendered surface paper and inserted in groups through the book. The colored frontispiece is a replica of a beautiful painting by Charles Robert Patterson. The illustrations include pictures of 78 ships and portraits of 48 sea captains.

The 415 pages of text are packed full of the most interesting information about the ships, their captains, and their adventures, all narrated in clear, terse, easily read English, with no attempt at hyperbole or padding. The book, therefore, becomes almost an abstract of logs and should be extremely valuable as a source of reliable information on which to base sea tales or through which to get a real close-up picture of life at sea during the last half of the last century.

The edition of this book is small and, as is the custom of The Marine Research Society, it will not be reprinted. A limited number of copies are being held in San Francisco for sale; and Pacific Marine Review will be glad to handle your order as long as the edition lasts.

THE BALTIMORE CLIPPER, ITS ORIGIN AND DEVELOPMENT. By Howard Irving Chapelle. 195 pages, 8 x 10, profusely illustrated. Publication of Marine Research Society, Salem, Mass. Price $5 net.

A genuine piece of worth-while historical research, this book traces the lines of development of the early fast American sailing craft that were the inspiration for the great American clipper ships. The illustrations include a remarkable collection of profiles and line and sail plans of fast schooners and brigs, many of them supplied from the archives of the British Admiralty whose draftsmen "lifted" the lines of all unusual or fast types of captured craft. There are 49 such plans and 36 pictures of these vessels in action.

The first chapter treats the "Origin of the Baltimore Clipper." Then come chapters covering the part played by these craft in the Revolutionary War, their development from 1782 to 1812, their part in the War of 1812, their part in the slave trade, and their disappearance from the sea. The last two chapters give some very interesting data on Rules for Masting and Sail Plans and proportions of masts and spars.

"There is no type of vessel that has so much romantic and historical interest to Americans as that commonly called the Baltimore Clipper." Howard Irving Chapelle has incorporated in this book the material gathered in pursuit of his personal hobby and has thereby earned the thanks of all good lovers of the sailing ship.

Foreign Trade in 1930

National Foreign Trade Council Presents Annual Analysis Showing Decrease of Eight Per Cent. in World's Exports in Past Year

THE steady growth of international commerce was interrupted in 1930 for the first time since 1921 by a net decrease of about 8 per cent. in the volume of the world's export trade. The fact remains, however, that, in spite of the present downturn, international trade, as expressed in world exports, is still about 16 per cent. greater in volume than it was in 1925. About two thirds of this gain in the tonnage of world trade that had been made since 1925 up to the end of 1929 was retained at the end of 1930, on the basis of present figures covering about half the world's commerce.

World export trade in 1930, for the 101 nations of the world approximates $22\frac{1}{2}$ billion dollars. The total exports of these 101 nations for 1929 were $24,427,000,000, both figures being reduced to the common index of 1913 prices.

Europe

European export trade has been less affected by the present depression than that of any other section of the world. The actual volume of Europe's export business has remained very close to what it was in 1929, though its trade is less in current dollar values. In 1930, France, Russia, Rumania, the Irish Free State, and a number of other European nations have actually gained ground in the volume of their exports. Germany is within one or two per cent. of her 1929 export volume, while British exports, in spite of heavy losses early in the year, are only about 10 per cent. less than 1929. In fact, Europe as a whole took more than 90 per cent. of the amount of American exports she bought in 1929, the best showing our products made in any market during the year.

United States

Our own exports have fallen off from those of 1929 by approximately 15 per cent. during the first ten months of 1930. They are still, however, 35 per cent. greater in volume than before the war and about even with our exports in 1926. An encouraging feature in the United States, moreover, is that, with the omission of the automotive industry, the export of our finished manufactured goods for the first six months of the year shows trade has been carried on at more than 92 per cent. of the volume of the same months of 1929. In fact, many typical American products, such as electrical goods, tractors, construction machinery, mining and quarrying machinery, accounting and calculating machines, and cameras and photographic goods had larger foreign sales during the first six months of 1930 than in 1929, and are apparently continuing this record. With a few exceptions, manufactured goods of all kinds continue to circulate in approximately the same volume as previous years. This is particularly notable as accounting for the steadiness in European export trade, four-fifths of which, predominantly of a manufactured character, is from the nations of western Europe. Europe is once again carrying on practically half of the world's export trade and has achieved an advance of more than 14 per cent. in export volume since 1925.

Raw Material Decrease

The decreases in the world's export trade in 1930 have been almost entirely in the countries which chiefly produce raw materials. Both Canada and Japan, second and third to the United States in the amount of foreign trade gained since the war, have suffered losses, as compared with 1929, in excess of ten per cent. South American exports, notably those of Argentina and Brazil, have decreased in volume by a like amount. and the nations of Latin America in general continued to see a diminution of exports which, with few exceptions, had already appeared in 1929. Latin America, however, is still selling its products abroad in fully 20 per cent. greater volume than before the war and in an amount about equal to its business in 1926.

Asia, which provides one and three-quarter times the exports of Latin America, had increased the volume of its foreign sales since 1913 by 60 per cent. by the end of 1929. Although Japan, China, India, and the Dutch and British East Indies all sustained losses in 1930, the total recession did not exceed 12 or 15

TOTAL EXPORT TRADE OF 101 NATIONS BY CONTINENTS

Adjusted to the Value of the 1913 Dollar

	1913	1925	1927	1928	1929
North and South America	4,618	5,834	6,554	6,474	[illegible]
Europe	[illegible]	[illegible]	11,144	11,454	[illegible]
Africa	[illegible]	[illegible]	962	1,061	[illegible]
Oceania	505	669	688	696	[illegible]
Asia	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	20,566	[illegible]	[illegible]	[illegible]
Less United States	[illegible]	[illegible]	[illegible]	3,663	[illegible]
	17,786	17,419	[illegible]	[illegible]	[illegible]

	1913-25		1913-27		1913-28		1913-29	
	Mills. of $	Per cent	Mills. of $	Per cent	Mills. of $	Per cent	Mills. of $	Per cent
EXPORT GAIN OF 100 NATIONS	- [illegible]	- [illegible]	+ 1691	+ 9	+ [illegible]	+ 13	+ [illegible]	+ [illegible]
EXPORT GAIN OF U.S.	+ 663	+ [illegible]	+ 991	+39	+ 1129	+ 47	+ 1301	+ [illegible]
EXPORT GAIN OF 101 NATIONS	+ [illegible]	+ [illegible]	+ [illegible]	+ [illegible]	+ 3461	+ 18	+ [illegible]	+ [illegible]

THE 10 NATIONS SHOWING LARGEST EXPORT GROWTH 1913-29 and 1928-9

1913-29	Mills. of $	Per cent	1928-9	Mills. of $	Per cent
United States	[illegible]	[illegible]	Germany	[illegible]	[illegible]
Canada	[illegible]	121	United States	[illegible]	3
Japan	[illegible]	[illegible]	Japan	60	9
British Malaya	[illegible]	[illegible]	Sweden	49	16
Argentina	[illegible]	[illegible]	Russia	41	14
China	171	56	Persia	37	50
Dutch East Indies	170	[illegible]	British Malaya	36	11
Denmark	[illegible]	[illegible]	Canada	[illegible]	4
Sweden	[illegible]	60	Belgium	32	[illegible]
Australia	96	[illegible]	Hungary	31	33

*Latest fiscal year. x Estimated.

Allowing for change in keeping trade figures in the Netherlands, Europe reached its 1913 export volume in 1929 for the first time since the war.

The export indices used above have been compiled by the Economic and Financial Sections of the League of Nations, 1913 being 100, as follows: 1925 1.56; 1926 1.44; 1927 1.40; 1928 1.[illegible]; 1929 (estimated) 1.3[illegible]. See Memorandum on International Trade and Balances of Payments 1913-1926, Vol. 1 page 11, and 1913-1927, Vol. 1 page 37. The figures above represent, therefore, the real values of world exports as reduced to the common index of 1913 export prices.

World's exports by nations during 1930.

per cent. Australian foreign trade has likewise fallen off fairly heavily, and the loss will about cut in half the 25 per cent. gain which the Commonwealth has made in her export volume since the war.

The present decrease in exports, among the countries producing large surpluses of raw materials has followed a period of unusual expansion of production which culminated in 1930 in a severe reduction of the prices of many basic products. Taking the period from 1925 to 1929 as a standard, the normal growth of population of about 5 per cent. and of general consumption of about 15 per cent. for such a period has been substantially exceeded in a number of outstanding cases. The world output of crude petroleum increased in this interval by 35 per cent., that of copper by about 25 per cent., silk by about 21 per cent. (in addition to an increase of 130 per cent., in the production of artificial silk), and that of wood pulp about 20 per cent. The acreage under coffee has been increased by 50 per cent. in this period and the crop increased by 65 per cent. in a single year. Since 1922 the world's sugar crop has increased by 45 per cent.; and since 1923 the world's rubber crop has increased by 40 per cent. The world wheat crop increased from the middle of 1925 to the middle of 1929 by about 27 per cent.

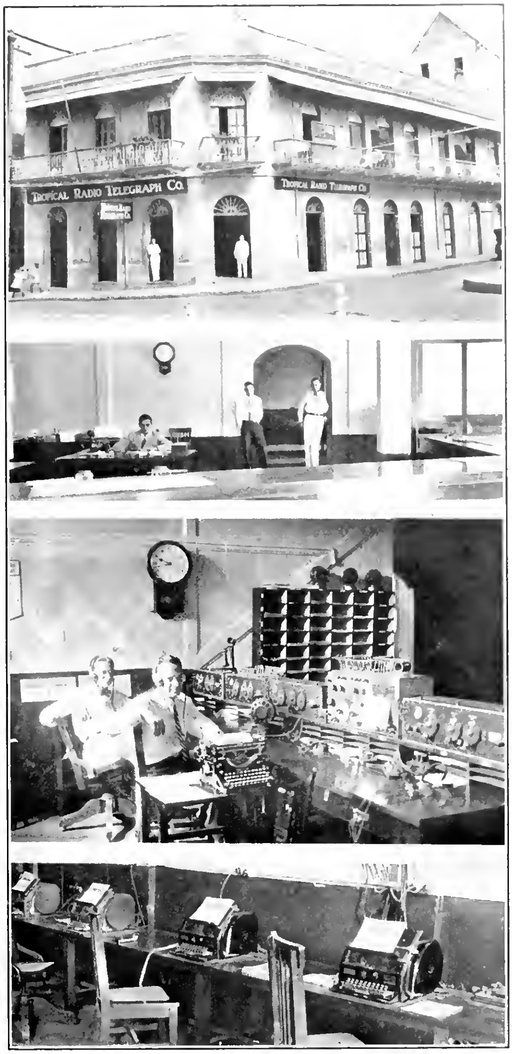
Other Factors

Surpluses in these products have appeared not merely because of their increasing production, but because of other factors of increasing influence. The wide use of reclaimed rubber, for instance, and of iron and steel scrap is one phase of economy in manufacturing that has resulted from extensive experimentation. The greater employment of rustless steel, the increasing durability of road construction, and the longer life of tires are factors of another phase of modern industry tending to keep products in longer use. The discovery of synthetic substitutes has caused modifications in industries as widely divergent as the nitrate, leather, and silk industries. There has been growing competition, tending in many cases to increase more selective buying habits in the general public.

The mere increase of production could not have brought about the price recessions of last year had not some or all of these additional factors operated. The present condition in world trade is the effect of these combined influences. It is reflected in an inevitable temporary slackening in consumption, until the vast resources in buying power, steadily tapped since the war, again resume their normal function in stimulation of trade activity and continued national prosperity.

World prices are lower, meanwhile, than at any time since the war; even lower than in 1921. They have decreased in the last year by fully 15 per cent., approximating, as an index of present world export values, a figure of less than $1.20 as related to current dollar values in 1913. The fact that the greater part of this year's loss in foreign trade is in raw materials, combined with the relatively steady market for the products of manufacturing, indicates that the present situation is temporary and presages an improvement for the near future.

Radio in the American Tropics



Inaugurating a new service of communication between Panama and the world at large, the Tropical Radio Telegraph Company, formally opened its service by sending a message of greeting from President Arosemena of the Republic of Panama to President Hoover.

The transmitting equipment was built by the General Electric Company for the Radio Corporation of America which made the installation.

The pictures above show the offices of the Tropical Radio Telegraph Company in Panama City; the public office where messages are received; the operators' room in the main office; and the teletype machines used between the main office and the new office at Cristobal.

Methods Employed in the
Launching of the President Hoover

Largest American-Built Merchant Vessel Ever Launched Successfully Floated at Newport News, Virginia, for the Dollar Steamship Lines of San Francisco

ON December 9 the new passenger liner President Hoover was christened by Mrs. Herbert Hoover with a bottle of sea water gathered from widely separated points on the Dollar Round-the-World routes and was successfully launched from the ways at Newport News Shipbuilding & Dry Dock Company, Newport News, Virginia, before a large group of shipping, business, and political notables.

The twin-screw, turbo-electric steamship President Hoover will be the first of the new vessels to be added to the service of the Dollar Steamship Lines Inc., Ltd., of San Francisco. This vessel has a length of 653 feet, beam of 81 feet, depth of 52 feet. She will measure 23,000 gross tons and will be the largest merchant vessel ever built in the United States.

Modern accommodations of the finest type, in some respects superior to those of the largest passenger vessels afloat, are being provided for 307 first class, 133 special class, and 776 third class passengers. There will be a crew of 324. There is a total of 643,000 cubic feet of cargo space, of which 60,000 cubic feet is refrigerated. The ship will carry 100 automobiles.

The propelling machinery consists of twelve Babcock & Wilcox high pressure, superheated steam boilers and turbo-electric machinery by the General Electric Company to develop in excess of 26,500 shaft horsepower. The speed of the vessel in service will exceed $20\frac{1}{2}$ knots.

The steamship President Hoover will meet all requirements of the International Convention for Safety of Life at Sea and is fitted with all of the latest safety

Fore poppet of the President Hoover showing the plate saddles and methods of shoring employed.

After poppet built up with $7\frac{1}{2}$ x 12 pine planks with two longitudinal layers to each transverse layer. The propeller is designed to transmit 13,250 horsepower at 125 revolutions per minute.

devices, including gravity davits for lifeboats, long range wireless, radio direction finder, and Fathometer.

Steamship President Hoover was launched from one of the twin semisubmerged ways, on which in recent years most of the large vessels at the Newport News Shipbuilding and Dry Dock Company have been built. These ways have at their outboard ends large caissons and are therefore virtually dry-docks. This permits vessels to be built at considerably lower elevations than is the case with the usual type of outboard ways, thus greatly reducing the distance they have to slide before being fully water-borne at launching. Another advantage is that it permits all of the groundways being set in the "dry," instead of having in the neighborhood of 200 feet of their length under water. As a matter of fact, the groundways on which the President Hoover was launched have been kept permanently in place since they were first placed for the launching of the steamship California in October, 1927. This feature materially facilitates launching preparations and lessens the cost as well. The fact that the after end of the ship is below the water level makes it necessary to replace the keel blocks in that vicinity with trip shores and to do some wedging up aft before the water is fully admitted to the basin and the caissons removed, which is generally about two hours before the actual launching.

The releasing arrangement used in the launching of all vessels at that yard is the hydraulic trigger type;

and in the semisubmerged ways there are trigger pits provided for their installation. There is a trigger mechanism for each way; the ones used in this launching each have a capacity of 610 tons. The hydraulic cylinders are 14 feet in diameter; and the mechanisms are installed between two sections of the groundways, to which they are rigidly attached. The trigger bears against a cast steel shoe fitted at the end of one of the sections of the sliding ways. While the capacity of these triggers is sufficient to hold a very large vessel even after all its weight is being supported by the packing of the sliding ways, as a matter of precaution dog shores are fitted at some convenient location aft of the triggers, and these are cut out just before the hydraulic triggers are released.

Groundways

The groundways for this launching extended from a short distance abaft the stem to the caisson, at which point there was 18 feet 6 inches of water over them. With this long extension of ways and depth of water pivoting took place before the center of gravity passed the end of the ways; consequently there was no tipping moment at all about the latter, which is another favorable feature of the submerged ways. The ways are constructed of 12-inch by 12-inch yellow pine, they are sheathed on the upper surface with 3-inch by 12-inch oak, and have a 4-inch x 16-inch oak ribband extending about 4 inches above the sheathing. They are made in seven sections, securely joined to each other by means of steel buttstraps. Substantial shoring was fitted at intervals throughout their entire length, to prevent any displacement of ways prior to, or during the launching process.

Sliding Ways

The sliding ways used are constructed the same as the groundways, but without a ribband. They are in five sections, joined together by steel buttstraps, with through toggle pins. The thickness is 15 inches. Joggled wedges spaced approximately every 20 feet were used to hold the sliding ways about 2 inches clear of the ribbands on the groundways and were removed shortly before the launching. To prevent pressure coming on the greased ways before the proper time "grease irons" approximately 5/8 inch thick, 7 inches wide, and 9 feet long were placed between the sliding and the ground ways at about 15-foot intervals. Those aft in way of trip shores were removed the day before, and the remainder on the morning of the launching.

The illustrations show the general type of the bow and stern sections of the cradle. In order that the fore poppets might be located within a reasonable distance of the stern, three plate saddles with extension brackets were fitted to provide a substantial support for them. The No. 1 saddle was 36-pound plate, 78 inches wide, fitted with three heavy brackets; No. 2 was 72 inches wide, also fitted with three brackets; and No. 3 was 26 inches wide, fitted with one bracket. Wood packing was fitted between the saddles and the hull up to about the bottom of the brackets and cement was fitted where the brackets had considerable flare. The fore poppets were built up in the usual manner, and two rows of white pine crushing strips were fitted for a distance of about 20 feet in order to distribute the pivoting pressure over a greater area. Tie rods only were used to hold the fore poppets together, in conjunction with oak strongbacks at each saddle. The main packing was in nine sections, each firmly lashed

Trigger pit of the semisubmerged ways at Newport News. The trigger bears against a cast steel shoe which is located at one end of a section of the sliding ways.

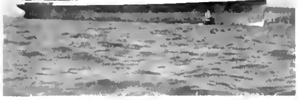
at 5 foot intervals to prevent disassembling when they are withdrawn. At each end of each section angle clips were fitted on the inside of the packing to prevent its being displaced outboard during launching. Tie rods and frapping at the forward and after ends were also fitted for that purpose. The after poppets were built up with alternate longitudinal and transverse layers of 7-½ x 12-inch pine, there being two longitudinal layers to each transverse one. The latter had alternate open spaces where the height of the packing was sufficient to permit such an arrangement.

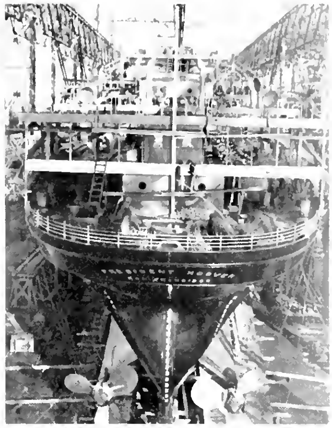
Launching Lubricant

The launching lubricant was similar to that used in the launching of other large vessels at the Newport News yard. It consisted of an initial layer of stearine, above which were applied generally three other layers of tallow and grease. The initial layer of stearine varied from one to four coats, increased by sections from forward aft, the heaviest coats being applied in the pivoting region. The wedging up was done by means of tapered oak wedges located on frame and half frame spaces throughout the length of the packing. All wedges were 6 inches wide by 9 feet long and had a taper of approximately 1 inch per foot. There were three rallies on the wedges.

During the construction of the vessel it rested on 112 keel blocks spaced 5 feet apart; and A frames were used under the stern. Alternate solid pine and collapsible oak blocks were used for about 60 per cent. of the length from forward, and solid pine blocks aft, of that point. About a week before the launching the alternate solid blocks in way of the collapsible ones were replaced by quick-releasing sand blocks. A few days before the launching the 30 solid blocks aft were replaced by 15 trip shores, this being done because that part was below the water level. The use of collapsible and sand blocks saves considerable time during the launching period as it leaves a minimum of solid blocks to be cut out. The cutting out of the latter was started from aft coincident with the last rally on the wedges. Removal of the collapsible blocks followed; and the sand blocks were the last to be released

Scenes at the Launching of the Dollar Liner President Hoover





Upper left: The bulbous bow of the President Hoover.

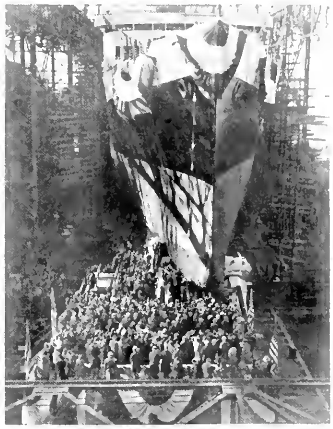
Above: Being towed to the dock after the launching.

Upper right: Stern view.

Lower left: Leaving the ways.

Lower: Mrs. Herbert Hoover and party.

Lower right: Another view of the bow.



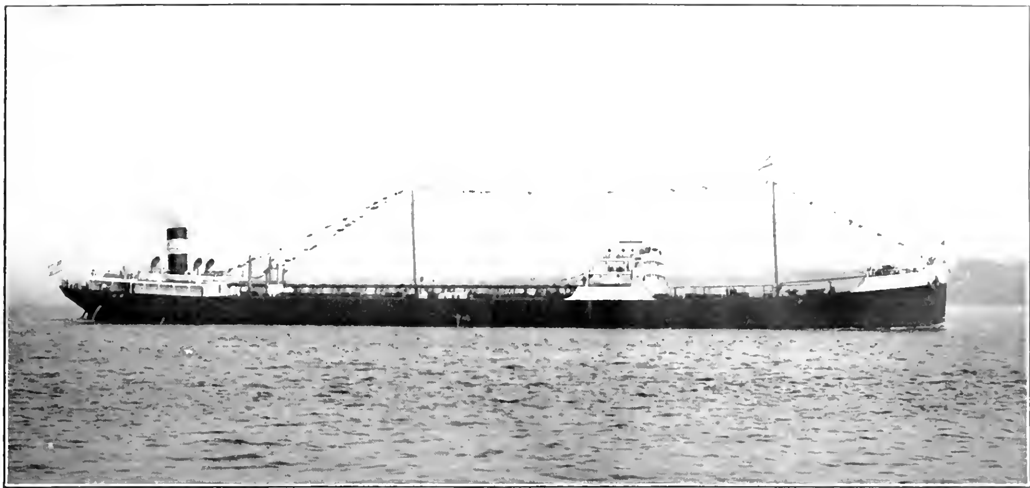
The vessel when launched was in a fairly advanced state, particularly in the matter of propulsive machinery and deck auxiliaries. The boilers were installed, and the main motors with all shafting and propellers were in place. All boiler and engine room auxiliaries and the refrigerating machinery were also installed.

The principal items of launching data are as follows:

Inclination of keel per foot	1½ inch
Inclination of groundways per foot	5/8 inch
Transverse inclination of groundways per foot	3/8 inch
Total length of groundways	770 feet
Width of groundways	84 inches
Distance between ribbands, forward	30 feet, 1 inch
Distance between ribbands, aft	30 feet, 6 inches
Length of sliding ways	560 feet
Width of sliding ways	72 inches
Bearing surface, square feet	6720
Width of packing	60 inches
Total launching weight, tons	about 13,500
Unit pressure, tons per sq. ft.	about 2
Maximum pivoting pressure, tons	1600
Distance slid to pivoting	460 feet

Public Interest in Shipping.—Public interest in the merchant marine has never been sufficiently strong. We all believe in good roads on land. A merchant ship is the only good road on the water. For the same reason that the government builds highways and leaves them to private operation it is justified in helping build ships for private operation. Both national defense and commerce require ships.

(—Calvin Coolidge in New York Herald-Tribune)



Two Modern Bulk Oil Tankers

Details of the Construction and Equipment on the Tankers G. Harrison Smith and the W. S. Farrish, Recently Delivered to the Standard Shipping Company

THE Federal Shipbuilding and Dry Dock Company of Kearny, New Jersey, has recently completed for and delivered to the Standard Shipping Company of New York two single-screw, high pressure, high superheat, steam turbine drive tankers that represent a distinct advance in marine propulsion economy and are excellent examples of modern improvement in tanker design and construction. These vessels, the G. Harrison Smith and the W. S. Farish, are both now in regular service and are making very fine records for dependable fuel economy.

Built on the Isherwood Bracketless System of longitudinal framing, under special survey to the highest class of the American Bureau of Shipping, these vessels are fitted to meet all requirements of the United States Steamboat Inspection Service and of the new Load Line Act. The cost approximates $2,000,000 each.

The hulls are divided into seventeen compartments by 16 water and oil-tight bulkheads. Starting forward, these compartments include: Forepeak, forward hold, coffer dam, eleven main cargo tanks, pump room, engine room, after peak. Throughout the length of the cargo oil tanks a center line longitudinal bulkhead is fitted up to the shelter deck and two parallel longitudinal bulkheads, port and starboard, from main to shelter decks form expansion trunks. On the outboard side of these longitudinal bulkheads the port and starboard tween deck spaces are divided into five summer tanks on each side.

The bridge erection amidships houses very comfortable quarters for captain, radio operator, and deck officers, and one or two passengers; and the steel house aft provides convenient and comfortable quarters for the engineer and petty officers and the balance of the crew. The galley and messroom are located aft.

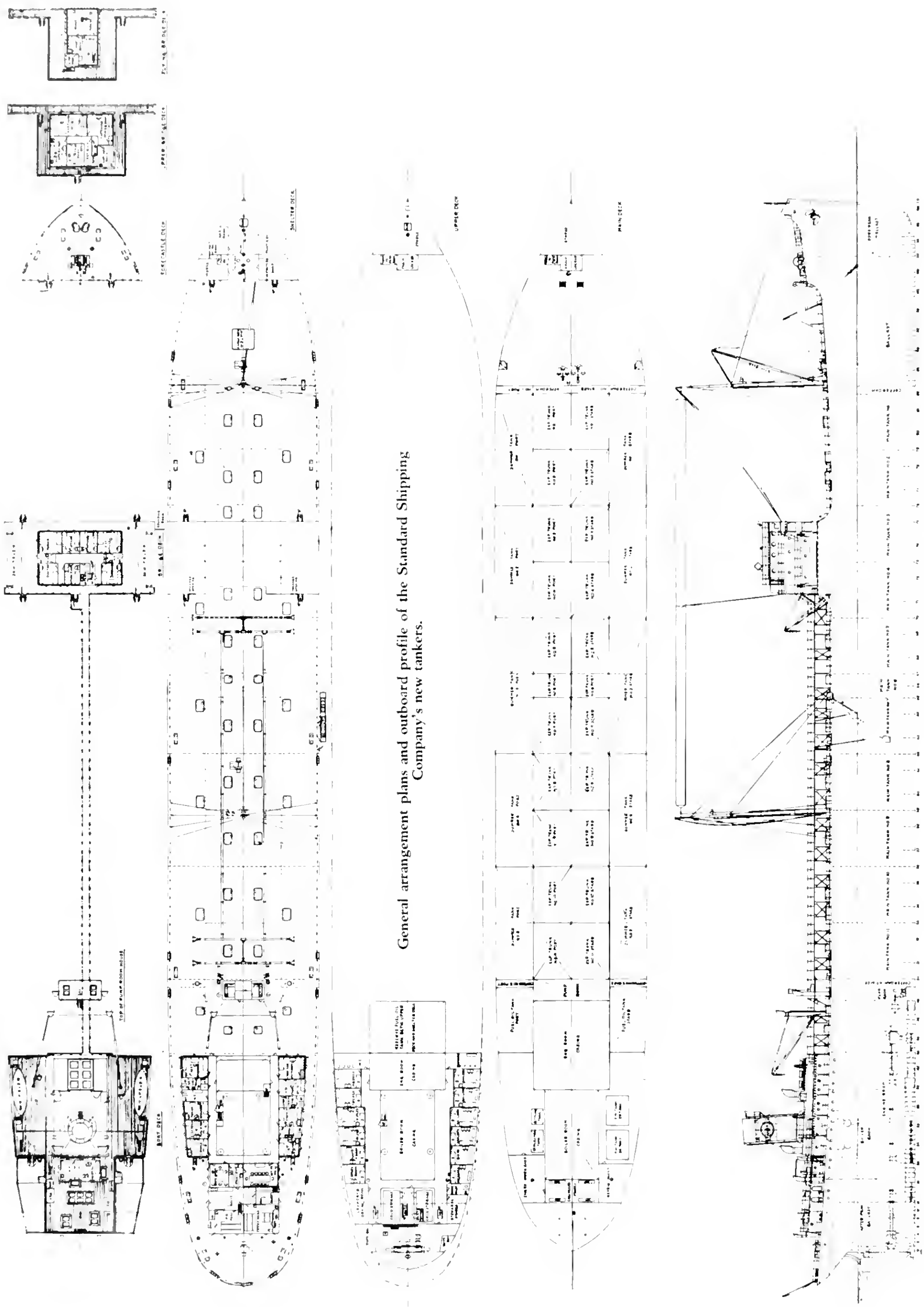
Cargo Pump Room.

A 12-inch suction line having a 10-inch branch to each main cargo tank and a 6-inch shipping line with 6-inch branches are installed on each side of center line bulkhead. Summer tanks are fitted with an 8-inch suction line port and starboard with 8-inch branches to each tank. In the pump room located just forward of engine room are installed three Northern horizontal rotary geared main cargo pumps and one Northern cargo stripping pump. Each of the main pumps is driven by a 200-brake horsepower at 1150 revolutions per minute Westinghouse motor. All these motors are installed in the engine room, the driving shafts and control shafts being taken through the bulkhead in suitable stuffing boxes. Even the lighting of this pump room is external—through gas and vapor-tight ports in the engine room bulkhead; so that no electric wiring of any character is installed inside this space.

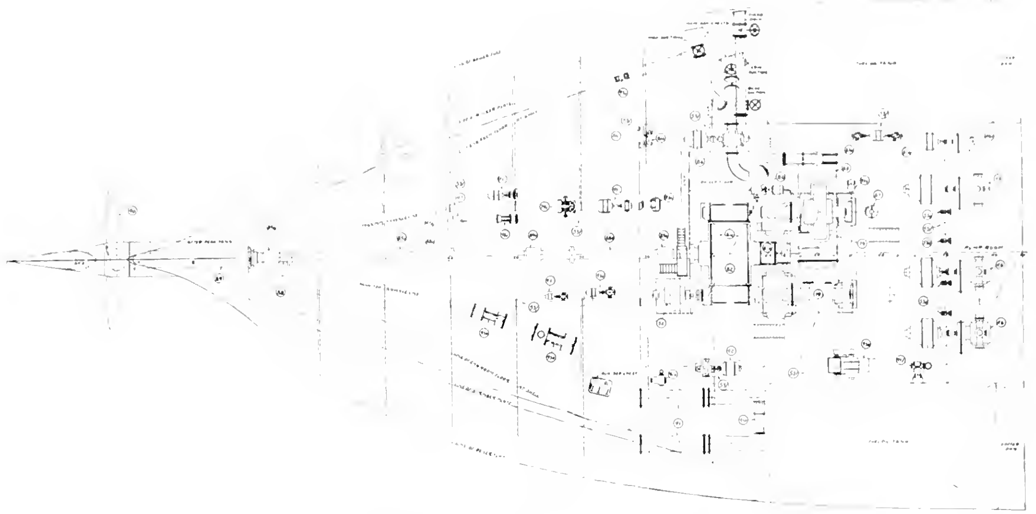
Each cargo pump has a rating of 2000 gallons per minute and the stripping pump a rating of 600 gallons per minute at 125 pounds pressure. Each main pump has a separate 10-inch discharge line to the deck with discharge outlets port and starboard, forward and amidships.

The windlass is of the spur gear type driven by a 75-horsepower General Electric motor; and there are three compound geared type cargo and warping winches each driven by a 25-horsepower General Electric motor. These deck auxiliaries were built and supplied by Allan Cunningham of Seattle.

The Oertz streamline rudder is operated by a Hyde



General arrangement plans and outboard profile of the Standard Shipping Company's new tankers.



Machinery arrangement used on the G. Harrison Smith and the W. S. Farrish.

2-cylinder, hydro-electric stearing gear actuated by twin Waterbury hydraulic pumps and 20-horsepower Westinghouse motors. Sperry electric telemotor control and gyro-pilot are used for automatic steering. For safe navigation the pilot house is equipped with Sperry gyro-compass, Kelvin and White standard compass, R.C.A. radio direction finder, and the Submarine Signal Co.'s Fathometer.

Gas Freeing System.

One of the most novel and interesting installations on this vessel is the equipment for gas-freeing and cleaning of tanks by the Butterworth System, which uses heated water delivered by the fire pump through fire main and hoses to washing machines which are projected into the tanks through openings in the deck provided for that purpose. Provision is made for heating the water by steam in evaporators or jet type heaters. This system was described in detail in the November issue of Pacific Marine Review. After extensive experiments the Standard Shipping Company has adopted this system as standard equipment for its entire fleet. By this method the ship's crew is able to gas-free the entire vessel in from twenty to twenty-four hours.

Propulsion Machinery

The propulsion plants of these two vessels are unique in several respects. First, they carry the highest boiler pressure of any American commercial marine plant. Second, while at sea steam is used only in the main turbine. Third, they are fitted with the first condensers to go to sea with tubes rolled at both ends (no packing).

Steam at 400 pounds pressure per square inch and a total temperature of 750 degrees Fahrenheit is supplied by two Babcox & Wilcox, inter-deck superheater type, water-tube boilers installed on a flat aft of the turbine and over the shaft alley and entirely enclosed by steel bulkheads. Horizontal type air preheaters are fitted above the boilers. Diamond soot blowers are installed to take car of boiler tubes, superheater tubes, and air heater tubes. Each boiler has 5080 square feet of boiler heating surface, 903 square feet of superheating surface, and 3460 square feet of air heating surface. Each boiler is fitted with four Todd mechanical pressure atomizing oil burners and Todd air registers; and these burners are served by Todd duplicate oil heating and straining equipment. Fuel oil is served to these burners by a Northern rotary geared pump at 250 pounds pressure per square inch. Air for combustion is preheated to 310 degrees Fahrenheit and feed water to 300 degrees Fahrenheit. This combination produces a boiler efficiency of better than 86 per cent.

Draft on the furnaces is maintained by a Sturtevant silent-vane, forced-draft fan and a Sturtevant induced draft fan, each motor driven and with controls interconnected. Suitable feed water is assured by the installation of a Davis Paracoil evaporator with a capacity for 34 tons of feed per day evaporated from salt water, the steam in coils at 125 pounds pressure and the vapor in shell at 20 pounds pressure.

The main feed pump is of Worthington make, motor driven, with a capacity of 71 to 110 gallons per minute against a discharge pressure of 500 pounds per square inch.

The boiler room is equipped with a Thwing stack pyrometer, a Tagliabue recording steam gauge, a Ranarex continuous recording carbon dioxide indicator and a Niagara disk-type fuel oil meter.

Both the pump room and the boiler room are protected by Lux fire extinguishing system. A 24-cylinder installation is located in the steering gear compartment aft, piped to suitable outlets in both spaces and controlled either from the crew's quarters directly above the cylinders or from the fore and aft walkways amidships.

Main Turbines

The steam from these boilers is figured to reach the throttle of the turbine at 375 pounds pressure and 725 degrees total temperature. The turbine is a DeLaval cross-compound unit with a normal rated capacity of 4000 shaft horsepower driving a single propeller through DeLaval double reduction gearing. The normal propeller speed is 75 for a vessel speed of 11 knots.

The high pressure turbine unit operates at 5500 revolutions per minute. It is of the impulsive type with 11 expansion stages. The low pressure unit operates at 4270 revolutions per minute and is of the impulse type with seven stages. Steam for operating three stages of Davis feed water heaters is bled from three points in the high pressure turbine. An astern turbine of the two-stage type is carried in the exhaust end of the low pressure turbine casing. Kingsbury thrust bearings are fitted at the forward end of each turbine casing and of the low speed reduction gear casing. The low speed gear on these jobs have a diameter of 128 inches and a working face of 44 inches.

The low pressure and astern turbines exhaust through the bottom of the casing directly into the condenser which is hung athwartships on counterbalanced springs to allow for contraction. This condenser is of the Foster-Wheeler new type, with tubes rolled at both ends, as described and illustrated in the October issue of Pacific Marine Review. Two twin steam jet air pumps maintain the vacuum.

The condenser is served by a Worthington centrifugal circulating pump with a capacity of 5400 gallons per minute and a Worthington condensate pump.

A 175-kilowatt, 240-volt Westinghouse generator is driven by an extension of one of the pinion shafts of the low speed reduction gear. This set takes care of all electrical requirements at sea. For port use, two 300-kilowatt De Laval-Westinghouse steam turbo-generating sets are installed.

These turbo-generating sets are so arranged that one of them is always ready to pick up the load automatically whenever the speed of the main propulsion turbine falls below 70 per cent. of its rated full load speed. In order that it may be ready to be automatically thrown in, one of the generators is always connected up to the power bus as a motor spinning the turbine in a vacuum with closed throttle.

These turbines have an auxiliary condenser system with Foster-Wheeler condensers with all rolled tube ends, served by Worthington pumps.

Lubricating oil for the turbine, thrust, and reduction gear bearings and for the reduction gearing is supplied by a gravity system. A drain tank of 1000 gallons capacity is located directly under the main gear case and is fitted with sump pots for withdrawing the sludge. One settling tank and one gravity tank each of 900 gallons capacity are installed in the engine room casing at the shelter deck level. The settling tank is fitted with steam heating coils. Below these tanks there are installed two Griscom-Russell straight-tube type oil coolers each with a capacity of 75 per cent. of the full flow of oil in the system. The lubricating oil purifier is a Sharples motor-driven open-type having a capacity of 200 gallons an hour at 140 degrees Fahrenheit. A Davis oil heater of suitable capacity serves this purifier.

These tankers were built and engined on a guaranteed fuel consumption basis of 0.63 pound per shaft horsepower hour and while no trial data have been published it is understood that the G. Harrison Smith and the W. S. Farish are obtaining a better than guarantee figure sea service.

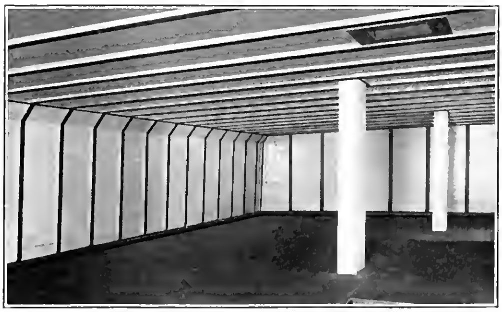
Standardizing Marine Insulation

The Panel System Offers an Economical, Sanitary Method of Installation and Minimizes Service and Maintenance Costs

FOR many years the Blue Star Line has operated one of the world's largest fleets of refrigerated cargo ships, hauling beef, mutton, and other frozen freight from South America to the United Kingdom and, more recently, much fresh fruit and other refrigerated cargo from the Pacific Coast to United Kingdom.

About five years ago the superintending engineers for this line, in collaboration with the technical staffs of British manufacturers of refrigerating machinery and insulation, worked out a panel system of lagging for insulation in vessels' holds that has proved, under severe service conditions, to be a simple and very effective solution of their insulation problem. This system now known as the Panel System has been standardized as to detail and is now offered to the American merchant marine by the Cork Insulation Company, Inc.

Briefly stated, the Panel System of Marine Insulation consists of standard fittings of wood and steel to be attached to bulkheads, side framing, and stiffeners in the ship's holds or tween decks in such fashion that they support wooden bars in which are cut slots for the reception of standard length 1-inch tongue and groove lagging. This lagging, when in place, seals a space between itself and the steel member



Tween deck space with insulation in place before installation of piping.

Panel system of cork insulation showing panel removed for inspection.

being insulated. This space may be of any thickness desired, as regulated by the insulation requirements. The space is filled with granulated cork. In standard installations of this system, the lagging boards are covered and protected by a smooth white enamel. This insures sanitation and gives the installation a neat and attractive appearance.

By this system the costs of both installation and maintenance are claimed to be greatly reduced.

Because of the standardization of the system and its fittings a small crew of well trained men can install the panels and their fittings with great rapidity.

For the same reason one man can rapidly disassemble any panel for regular inspection or for repair. One man with a wrench and screw driver can examine and overhaul a whole panel easily in half an hour.

On design work for insulation standardization again saves time and money. All the details of this system have been worked out and perfected for application in any ordinary type of ship structure; and a few minor changes will adapt these fittings to any construction in any sort of space.

Granulated cork as used in the Panel System is one of the cheapest and one of the most efficient insulation materials known to the industry. It has also the advantage of being portable; so that if the side of the ship be damaged or there be a leak in piping behind the lagging, the granulated cork can be scooped up and dried and replaced as good as ever when the repairs are finished.

Thus air pipes, sounding pipes, scupper pipes, brine pipes, or any fittings imbedded in the insulation can all be inspected and, if necessary, repaired almost as easily as if there were no insulation. Taking down a panel requires about five minutes of one man's time; erecting the same panel takes about twenty minutes

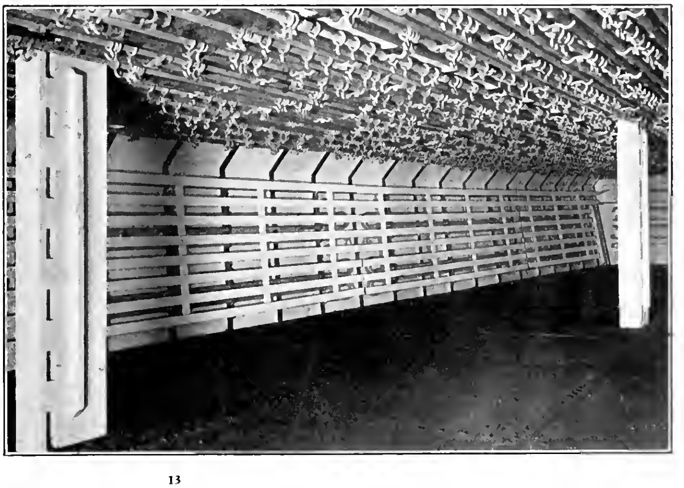
With the decks floored with two layers of corkboard laid in bitumen and lagged with 2-inch tongue and groove flooring nailed to wooden grounds set in the upper layer and with the Panel System applied to all bulkheads, skin plating, and ceiling, a marine refrigerated space is completely cork insulated more economically and more effectively than by any other known method.

The Blue Star Line has had nine large capacity refrigerated cargo vessels insulated with this system in service with good satisfaction for over three years. One group of these, the Stuartstar, Africstar, Rodneystar, and Raleighstar, each has a refrigerated capacity of 510,000 cubic feet. The other group, the Andalusia, Almeda, Arandora, Avila, and Avlona, each has a refrigerated capacity of 440,000 cubic feet. The Vulcan Star of this Line has a refrigerated capacity of 600,000 cubic feet, the largest refrigerated capacity afloat in any one vessel. She was delivered last June and is completely insulated with the Panel System of Marine Insulation.

This system, which, as described above, has been found so effective in British refrigerated ships, is now available, with standardized fittings following American practice and backed by the technical service of the Cork Insulation Company, Inc. This firm maintains a large staff of skilled refrigeration engineers whose expert advice and service are available to shipowners. There is also maintained a corps of experienced marine installation men; so that the firm is equipped to design and install complete insulation service with guaranteed results.

Tween deck section with Panel System of cork insulation and battens in place ready for service on a frozen meat carrier of the Blue Star Line.

Ease of inspection and efficiency of service have led to the standardization of this type of insulation by many lines.



No Cure—No Pay

Great Ingenuity and Skill Shown by Salvors of Stranded Tanker Tamiahua

By R. S. Gardiner*

THE successful floating of the Richfield oil tanker Tamiahua from her stranded position near Pescadero Point, California, on Tuesday, November 25, is a further testimonial of the adequate salvage facilities now maintained on the Pacific Coast by Merritt-Chapman & Scott Corporation, nationally known marine salvors

The tanker Tamiahua, while in ballast bound from San Francisco to Los Angeles Harbor, stranded during a "pea soup" fog on Pescadero Point about 4:00 p.m. on Thursday, November 6. When the vessel first stranded she was grounded amidships on a submerged ledge and lay broadside to the beach. During the night she shifted her position, washed in on the rocky beach, and finally, with practically all tanks punctured, rested on the rocks at right angles to the beach line with her stern to seaward.

*Marine Manager, Pacific Division, Merritt-Chapman & Scott Corporation.

Engine driven air compressors on the deck of the Tamiahua.

After several unsuccessful attempts by the Coast Guard and tugboats to float the vessel, a salvage contract was entered into with Merritt-Chapman & Scott on a "No Cure—No Pay" basis. When the salvors boarded the Tamiahua they found her with all fires out, the engine room, fire room, and pump rooms leaking, and all tanks including fuel tank and cofferdams with the exception of No. 5 cargo tank and forepeak, either open to the sea or leaking.

Soundings showed the vessel to be resting on an uneven rocky bottom with a ledge just awash about a half a ship's length astern, just clear of the starboard side, and a second ledge a little over a ship's length astern about four points off the port quarter. It was evident that in order to float the Tamiahua most of the tanks would have to be freed of water, together with the machinery space aft, and the vessel pulled clear of the beach between the two ledges. To accomplish this it was necessary to install adequate air compressors to force the water out of the tanks and gasoline pumping units to pump the engine and fire rooms, which meant that a vast amount of gear and equipment would have to be transferred from the salvage steamers to the Tamiahua.

An attempt was made to load salvage gear aboard the vessel from the sea by transporting equipment from the salvage steamers Peacock and Homer anchored offshore, but this was found impractical due to heavy seas prevailing. On realizing this condition, a high line was rigged from the bluff to the foremast on the Tamiahua, a distance of about 900 feet; and practically all the equipment was transferred from the salvage steamers berthed in San Francisco by motor trucks overland to Pescadero Point and thence over the high line. To facilitate communication between the ship and shore a telephone was installed from the radio room on the ship to the shore.

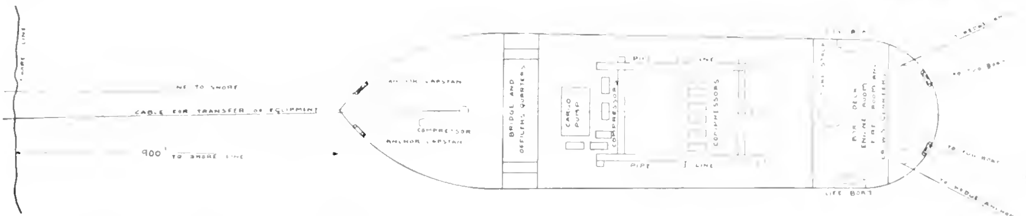
Rough weather added to the other difficulties encountered in the salvaging of the oil tanker.

During the first two weeks that the Tamiahua was ashore very heavy seas prevailed practically all the time. During one of these storms the forward end of the tanker Lyman Stewart, which has withstood the pounding of the seas for the last eight years off the Cliff House, broke in two and further settled in her bed, and the stranded lumber steamer Coos Bay, which has been an eyesore to passing steamers in the Golden Gate, rolled over and practically disappeared.

It is needless to say that these were trying days for the salvors aboard the Tamiahua, but by keeping her full of water they were able to withstand this weather and to carry aboard over the high line the necessary equipment to finally float her clear of the reef.

During this time there were installed 12 gasoline engine driven air compressors, four 6-inch and one 12-inch gasoline engine driven centrifugal pumps, two gasoline driven lighting sets, four gasoline engine driven Lidgerwood hoists, blocks, falls, and other equipment.

Into this simple sentence there



Diagrammatic sketch showing lines attached to the hull of the tanker and arrangement of air compressors installed on deck.

is packed a lot of complicated work and service that deserves considerable elaboration. On board the salvage steamers Peacock and Homer when they left Los Angeles there were three Rix Six air compressors, each of 130 cubic feet displacement and each driven by a 32-horsepower LeRoi gasoline engine; one Rix 220 cubic feet displacement compressor; one 160 cubic feet displacement Sullivan air compressor; one 220 cubic feet displacement Chicago air compressor; two electric generating sets, each driven by a LeRoi gasoline engine; the gasoline engine drive hoists and the gasoline engine drive pumps. These were all taken over the high line, installed in suitable locations on board the tanker, and connected up so as to be of most effective use.

The generating sets were connected in on the wiring of the vessel and electric light was used wherever it was safe to do so.

The air compressors were connected to the large cargo piping on deck and leads from this piping were taken to any point where compressed air was needed.

Before air could be put on the various tanks to free them of water the vents had to be closed, the hatches made tight and air gauges installed to determine the amount of pressure being applied to the tanks. The compressors as set up were so arranged that any one tank could be blown at a time or air admitted to all tanks at once. Connections were also made to the capstans forward and aft to operate them with compressed air, and when the vessel finally floated she was steered to San Francisco operating the steam steering gear by compressed air.

It soon became apparent on more thorough inspection that additional compressor capacity would be needed. On Monday, November 17, two more Rix Sixes were ordered and were furnished immediately by the Rix Company of San Francisco. On November 24 at 11 a.m. an S.O.S. call was received at San Francisco for four more Rix Sixes. These were shipped at once from stock and at 7:30 p.m. the same day were all in operation installed aboard the vessel. This is, we think, a remarkable record for dispatch. A Rix service engineer was on the job with these compressors and rendered valuable assistance in hooking up the compressed air to the various items of machinery.

The total capacity of compressors in use on the Tamiahua was 1680 cubic feet per minute piston displacement and 1303 cubic feet per minute delivered at 100 pounds pressure. In operation the compressed air was delivered to the deck piping at 100 pounds per square inch pressure and was bled from these pipes into the cargo tanks and to the machines as required. Care was necessary in this operation and the valves had to be watched very carefully as too heavy pressure in the tank would either blow by the water seal and waste the air or strain the deck. To equalize the water pressure in the tanks required air pressure of from 7 to 16 pounds per square inch. Those who are familiar with the use of compressed air will realize that this was "some job". This tanker is 500 feet long, with a beam of 71 feet

(Please turn to Page 26, Adv. Section)

Some views showing the tanker Tamiahua in the surf near Pescadero Point and the high line which was used, on account of the heavy sea, to convey materials for salvage to the stranded vessel.

Some Merchant Marine
Legislation Pending at Washington

Loans, Loadlines, Limited Liability, Ladders, and Longshoremen Represent Some of the Interests Involved in Bills to be Considered by Congress in the Present Session

By George H. Manning

THERE are nearly two score measures now pending before Congress and its various committees directly and, in some cases, vitally affecting the American merchant marine. There are many others affecting shipping indirectly in greater or lesser degree. The only answer that can be given to a question about any action Congress may be expected to take is a guess based on former experience. No one can know exactly what or how much Congress will do within a given time. It is easy to formulate programs, but it is just as easy to knock them down; and Congress is a notorious offender when it comes to upsetting the apple cart.

However, there are two bills out of the many affecting shipping which seem reasonably sure of passage at this session because of the pre-eminent position on the legislative calendar. One of these is the bill (H.R. 7998) proposing to eliminate discriminations in the provisions of the Merchant Marine Act governing construction loans. The other is the bill (H.R. 9592) proposing to give the Postmaster-General authority to award mail-carrying contracts to lines operating vessels sold to them by the Shipping Board, in preference to privately operated lines. These two measures enjoy a preferred status because both have been passed by the House and favorably reported by the Senate Committee on Commerce. They are now on the Senate calendar and may be reached any time.

H. R. 7998 would clarify the provisions of the Merchant Marine Act by specifically providing that the reduced rate of interest to be paid the government for a construction loan shall be applied when a vessel is under construction, repair, or remodeling. The Comptroller General has ruled that, under the present law, a vessel is inactive during the period of construction. This bill also seeks to remove discriminations against borrowers and the government by fixing a minimum rate of interest to be paid when the vessel is being operated in foreign trade, in lieu of the indefinite sliding scale now in use. The present law states that the interest to be paid on loans during this "active" period must be "at the lowest rate of yield of any government obligation bearing date of issue subsequent to April 6, 1917. Because of the frequent fluctuations of interest rates on government bonds, shipowners borrowing one month may pay a higher, or lower, rate of interest than those borrowing in another month. This is manifestly unfair, not only to the shipowners but to the government. The bill would permit the Shipping Board to determine the rate of interest to be charged in any given case, but would set up a minimum of 3½ per cent. under which the board could not go.

H. R. 9592.—The mail contract bill is strongly urged by the Shipping Board, the Postmaster-General, and the Senate Committee on Commerce, which urged the Senate to act promptly on the measure at the last session of Congress. This advice, however, was ignored. In urging favorable action on the bill, which would permit the award of contracts without competitive bidding, the Shipping Board said:

"In the view of the Shipping Board, not only is the government under moral obligation to make available to a company purchasing a Shipping Board line the mail revenue already provided for such line by the Jones-White Act and congressional appropriations, but it would amount to a further and more serious breach of faith for the government, which through one of its agencies, the Shipping Board, has sold a service, to proceed through another of its agencies (the authority awarding mail contracts), to create a new and competing service by awarding to such service the very mail pay which Congress contemplated would be extended to the purchaser of the Shipping Board line. The government must find some way of being consistent with itself or this plan for building up an American merchant marine, so well started, will come to disaster."

H.R. 8361 is another bill which has a semi-preferred status. Sponsored by Representative E. L. Davis of Tennessee, the bill permits the Postmaster-General to award mail contracts to citizens of the United States to carry mail between ports between which it is lawful for a vessel not documented under the laws of the United States to carry merchandise. The bill prohibits the award of any of these contracts to any concern operating or controlling any foreign-flag ships which operate in competition with American-flag ships.

S. 3450 and H.R. 9591 are twin bills of major importance to those engaged in the coastwise and Great Lakes trade. These measures have been introduced by Senator Hiram Johnson of California and Representative Wallace H. White, Jr., of Maine. Senator Johnson's bill is before the Senate Committee on Commerce and Mr. White's bill is on the calendar of the House Committee on Merchant Marine and Fisheries. The bills propose to establish load lines for vessels in the coastwise and Great Lakes trade. They would give the Secretary of Commerce power to establish the lines. All vessels would have to be marked with an appropriate line, and penalties would be provided for violation of the law.

S. 1272. Senator Wesley L. Jones of Washington has before the Senate Commerce Committee a bill to codify all laws relating to shipping and the merchant marine. No action has been taken by the committee on this proposal.

S. 1327, introduced by Senator Duncan U. Fletcher of Florida, and now before the Senate Commerce Committee, would limit the liability of owners of vessels for loss occasioned in any manner without the knowledge or privity of the owner to "an amount equal to $40 for each ton of the ship's tonnage in respect to loss of, or damage to, vessels, goods, merchandise, or other things, whether there be in addition loss of life or personal injury or not; or an amount equal to $75 for each ton of the ship's tonnage in respect of loss of life or personal injury, either alone or together with the loss of, or damage to, vessels, goods, merchandise, or other things." The measure also provides that the individual liability of a shipowner shall be limited to the proportion of any or all debts and liabilities that his individual share of the vessel bears to the whole, and that the aggregate liabilities of all the owners shall not exceed the amount provided by section 4283 of the Revised Statutes.

S. 1574. Senator George W. Norris of Nebraska has before the Senate Commerce Committee a bill which he calls the "Longshoremen's Ship Safety Act," which would set up standards of safety for the maintenance and operation of all tackle and equipment used in loading and unloading vessels, including everything aboard ship even remotely concerned with these operations. The bill would require yearly inspections of certain equipment and inspection every two years of other equipment by licensed inspectors deriving their authority from the United States Employees' Compensation Commission. It goes very minutely into the equipment covered, even to mentioning gears, sprockets, clutches, and other parts of motors and winches, valves on compressed air feed lines, ladders, gangways, gangplanks, and the amount of illumination required for work aboard ship.

S. 314 and S. 306. Two bills designed to improve working conditions and to increase the wages paid to seamen, and containing many additional handicaps to the American Merchant Marine, are sponsored by Senator Robert M. LaFollette, of Wisconsin. Hearings on these bills were held in April, 1930, by the Senate Committee on Commerce. A bill similar to S. 306 is sponsored in the House by Representative Richard J. Welch of California **(H. R. 10629).** This bill is before the House Committee on Merchant Marine and Fisheries.

The first LaFollette bill (S. 314) would extend to seamen on foreign vessels the right to demand payments of advance wages and allotments, whether made within or without the United States or territory subject to its jurisdiction. It also permits all seamen, whether serving on a foreign or a United States vessel, to enter suit in any United States court for payment of wages. Masters, owners, consignees, or agents of any foreign vessel who violate the law would be subject to the same penalties which would be assessed against United States masters, owners, or agents.

The other LaFollette bill and the Welch bill go into considerable detail as to the shipping and discharge of seamen, one of these provisions prohibiting shipping or discharge on board a vessel unless it is connected with the shore by a gangplank. These bills also strengthen present laws concerning unlawful performance of duties of shipping commissioners; duties of shipping commissioners; seamen's agreements; use of continuous discharge books for seamen. They also exempt from the penal laws of the United States relating to inciting revolt or mutiny seamen who "remain peaceably" aboard a ship without working "while awaiting the payment of wages then earned and not paid," or who leave a ship when it is moored or at anchor in a safe harbor.

H. R. 3830. A very important bill "relating to the carriage of goods by sea" is sponsored by Representative White and is now before the House Merchant Marine and Fisheries Committee, of which he is chairman. The measure goes minutely into responsibilities of carriers and their liabilities. Among the provisions is one requiring the issuance of a bill of lading by the carrier, showing in detail the character, weight, number of packages or pieces and marking of goods.

H.R. 11241. Representative Noble J. Johnson of Indiana introduced this bill providing refunds to policyholders of insurance policies issued to masters, officers, and crews of vessels during the World War of premiums collected by the United States but not used in the payment of claims for losses under the policies. The amount of the refund in each case would be a sum which shall bear the same ratio to the total premiums paid by the policyholder as to the total amount refundable bears to the total amount of premiums paid by all policyholders.

H.R. 11431. A bill setting up a travel division in the Bureau of Foreign and Domestic Commerce was introduced by Representative Leonidas C. Dyer of Missouri. The new division would be used to boost travel by Americans to foreign countries. This bill, as well as that of Mr. Johnson, is before the House Committee on Interstate and Foreign Commerce.

S.J. Res. 64 and H.J. Res. 154. Joint resolutions directing the Interstate Commerce Commission and the Shipping Board to make a joint investigation "into the practicability of equalizing rail rates and ocean rates on export and import traffic between points in the United States and points in foreign countries by way of the several United States ports," have been introduced by Senator Frederick H. Gillett and Representative Robert Luce, both of Massachusetts. The resolutions would have the two regulatory bodies delve deeply into the rail and ocean rate situations and questions of export and import traffic. Senator Gillett's resolution is before the Senate Commerce Committee and Mr. Luce's is before the House Committee on Interstate and Foreign Commerce.

Bills Before Senate Commerce Committee

S. Res. 130 Extension of the coastwise shipping laws of the United States to the Philippines is the object of this resolution sponsored by Senator Arthur H. Vandenberg of Michigan. Hearings on this measure were held by the Senate Commerce Committee in October, 1929. This question is so tied up with that of Philippine Independence that it is doubtful if anything will be done with the Vandenberg resolution until the major question of independence is settled.

S. 4755.—Senator Royal S. Copeland of New York introduced a bill which would require "every seagoing vessel" to be equipped with a life-saving apparatus for each person on board which would be capable of condensing the water vapor of human breath.

S. 4504. Mr. Copeland also is the sponsor of a measure to provide 24-hour quarantine inspection service in all ports of the United States.

S. 4188. With an eye to the future when, according to transportation prophets, the skies will be filled with transoceanic airships, Senator Charles L. McNary of Oregon has introduced a bill "to provide for the establishment and development of American air-transport services overseas, to encourage construction in the United States by American capital of American airships, and other aircraft for use in foreign commerce." Government aid for airship lines would be provided in the form of contracts for carrying mail. A maximum of $20 per mile is set on the rate for this service. An "airship construction loan and insurance fund" would be created by the act, but the specific amount of the fund is not mentioned.

S. 2446. Senator Jones also sponsored a bill which would subject foreign vessels leaving American ports to the inspection laws of this country.

S. 1549. Senator Morris Sheppard of Texas introduced a bill permitting any seaman injured at his employment to maintain an action for damages at law, with right of trial by jury. In such an action all statutes modifying or extending the common law right or remedy in cases of personal injury to railway employes would apply. In the case of the death of a seaman, his personal representative would have the same rights to sue.

S. 897. Another bill by Senator Jones would remit the income taxes on sums received under the War Claims Settlement Act for injury to or destruction of any vessel, provided the money received would be set aside in a trust or building fund to be used in construction of new vessels of a type to be approved by the Shipping Board.

Pending Before the House Committee on Merchant Marine and Fisheries.

H.J. Res. 272. Representative Frederick R. Lehlbach of New Jersey introduced a resolution construing Section 7 of the Merchant Marine Act, which relates to preference to be given United States citizens in sale or assignment of vessels by the Shipping Board. Mr. Lehlbach would have the section construed as follows:

"Whenever the Board shall offer for sale a steamship line operated by the Board under the provisions of this section and the person then operating the line for the board shall make a bona fide offer to purchase said line and the vessels operated thereon, the board shall enter into negotiations with such operator to determine the terms and conditions of such sale and upon agreement the line shall be sold to such operator if the board is satisfied of the ability of such operator to maintain the service desired and proposed to be maintained. In the event of failure to reach an agreement upon the terms and conditions of such proposed sale the board shall not thereafter sell said line and the vessels operated thereon to any other person upon any terms whatever until the operator shall have been accorded the opportunity to purchase said line upon like terms."

H.R. 121. A bill "fixing the liability of owners of vessels" was introduced by Representative Fiorelo H. La Guardia of New York. The measure goes quite extensively into the question of liability.

H.R. 1645. An amendment to the La Follette Act which would require all steamers, whether owned by citizens of the United States or by foreigners, operating on the ocean or Great Lakes, carrying 50 or more persons, to be equipped with one side ladder for each lifeboat, was introduced by Mr. Welch of California.

H.R. 3588. Prohibition of the discharge of oil into all navigable waters is the object of a bill introduced by Representative Joe Crail of California. The bill goes into detail as to where and how oil and ballast water may be discharged and oil may be taken aboard a vessel. Penalties of fines or imprisonment are provided for violation.

H.R. 3829. Representative White has a bill "to provide more adequately for the discharge, maintenance, and repatriation of seamen in foreign ports." One of the paragraphs of this bill makes consular officers of the United States liable for the full amount of arrears of wages and extra wages due any discharged seaman, if the consul neglects to collect the money from the master of the ship from which the seaman was discharged.

H.R. 3828. Another bill by Mr. White provides that when a seaman has been discharged for mutiny, insubordination, or misconduct so serious that the discipline or safety of the vessel was endangered, the obligation of the vessel to maintain and transport the seaman shall be terminated with the discharge.

H.R. 3827. Mr. White also has a bill which would make final and binding, except upon review by the courts, decisions and findings of American consular officers pertaining to American vessels and seamen.

S. 2458. A bill which would provide for the inspection of vessels of 100 gross tons or over, propelled by internal combustion engines, has passed the Senate and is before the House Committee on Merchant Marine and Fisheries. Mr. Welch of California has introduced a similar bill, but it is likely that the Senate bill will be acted on by the House Committee, inasmuch as it is already half way through the legislative mill. The bill would exempt from inspection "vessels engaged exclusively in the fisheries."

H.R. 10129.—Use of a "fighting ship," either separately or in conjunction with any other carrier, would be prohibited under a bill introduced by Mr. White. A fighting ship is described in the bill as "a vessel used in a particular trade by a carrier or group of carriers for the purpose of excluding, preventing, or reducing competition by driving another carrier out of said trade, or a vessel put into a particular trade by any person beyond the reasonable requirements of the trade so as knowingly to produce excessive competition, with the object or effect of driving out of the trade the vessel or vessels of another carrier then operating a regular service in the trade."

H.R. 10628.—Another bill aimed to preserve life at sea was introduced by Representative Harry E. Rowbottom of Indiana. It would require all vessels to carry "at least one" life saving suit for every passenger, officer, or member of the crew. In the discretion of the Secretary of Commerce, vessels operating on inland waterways, except the Great Lakes, could be exempted from the provisions of the act.

H.R. 10740.—Dan A. Sutherland, delegate from Hawaii, introduced a bill which would extend the facilities of the United States Public Health Service to seamen who are not in the military or naval establishments of the country or who are not otherwise entitled to any medical relief by the Public Health Service.

H.R. 11788.—Mr. Free has a bill which would permit agents or pursers of vessels to make entry or clearance in customs collection districts in lieu of an entry or clearance by masters.

Navigation on the Columbia River

Part I. Pioneer Days in the Northwest When River Craft Were the Only Commercial Connection Between the Young Seaports and a Vast Hinterland

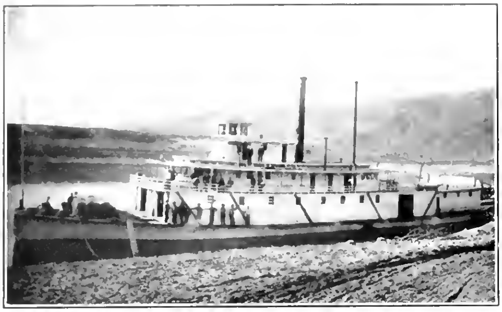
By Charles F. A. Mann

BEFORE the end of the present century America's second largest river will be put to work, largely as a direct adjunct to Pacific Coast maritime commerce. This river is the wild Columbia, mighty river of the Pacific Northwest, which, together with its array of important tributary streams, drain one of the potentially great regions of the world, as yet practically an undeveloped empire embracing parts of nine northwestern states and the central part of the province of British Columbia. Many millions of dollars will have to be spent, and it will take the heroic effort of a sizeable army of men for a period of perhaps fifty years. Full use of the now untamed Columbia, above its broad, quiet tidal section from Portland and Vancouver to the Pacific, will irrigate three million acres of land, generate twelve million horsepower of hydro-electric energy, supporting a million people, and provide a river commerce for 1200 miles of canalized Columbia, Snake, and Spokane river channels. This commerce will be gathered from the hills and plains of the Great Basin of the Columbia, that vast arid plain once the bottom of the ancient lake Bonneville, and will be carried to ships of the seven seas docking at Portland and lower Columbia river ports.

Six million tons of ocean commerce now move down the Columbia to the sea, through the 100-mile improved section of the lower river where a fine 35-foot channel is available the year round. Utilization of the untouched wealth lying in this great depressed saucer, with its mineral-filled, timber covered hills above, lying between the Rockies and the Cascades will bring cargoes on a scale a dozen times larger than at present. No one can predict the exact future of the Columbia River country, but it can be said with no uncertain note that those splendid old gentlemen who first navigated the unknown reaches of the middle and upper Columbia and the Snake rivers three-quarters of a century ago in their snorting, wood-burning stern-wheelers, hauling anxious and eager settlers and their belongings to the farm and mining country inland and their freight up and down, laid the foundation for one of the richest sections of the world, and for the prosperity of Portland and all the towns bordering the Columbia River below the Cascade Locks.

Visualize if you can, the first impressions the vast timber covered hills stretching away to the heavens, lying west of the Cascades, and the endless arid, but fertile plains on the east side of the mountains, visible from the Columbia, created on the pioneers of that period. No roads or railroads, and not even trails, and the country full of hostile Indians. It is natural that the Columbia, gathering together its great family of rivers on the western slope of the Rockies and both slopes of the Cascades, should be the first home of white men in the Northwest; and it is natural that commerce of that early period, between 1830 and 1880, should have followed the Columbia, Snake, and other rivers of the system into the heart of the country, reaping fortunes and winning fame for those pioneer steamboat men who carried the freight and hauled the frontier settlers to their destinations.

Not yet has the saga of the Columbia been recorded, for the first dreams of those upper-river navigators have yet to be brought to realization. Highways and railroads have delayed the use of the Columbia as a canalized river for a half century. Why? Because the Columbia is a mighty stream that can be controlled only by huge man-made work, and it cannot even be used for power because of the tremendous widths of its canyons and the volume of its flood. The annual run-off of the Col-



—Photo by courtesy of J. Howard Howe, Lewiston, Idaho.

O. W. R. & N. freighter Annie Faxon tied up to shore on the Snake river during the early days.

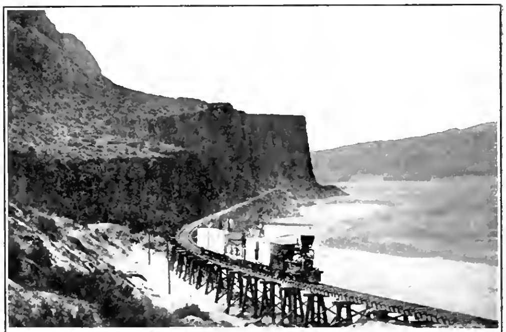
umbia is equal to that of the Mississippi. And so it had to be left untouched until an advancing civilization could utilize its power and generate enough commerce to pay for canalization, and enough foodstuff demand to pay for irrigating the three million acres of land in its basin.

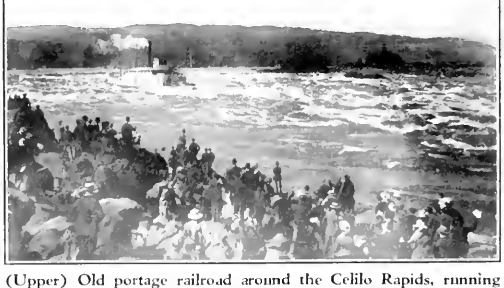
During the hey-day of early upper Columbia navigation, countless pages of Pacific marine history were written by the men and boats of the steamboat era. The whole commerce of the central part of Oregon, Washington, and Idaho depended on the steamboat schedules of the Snake and Columbia Rivers. Lewiston, long known as "Idaho's Only Seaport," proved a natural up-river terminus for the steamer lines, in search of freight, mineral products, and grain, along with passengers. At the other end of the picture we find hectic days and years of battle between rival steamboat lines on the Willamette River, south of Portland, where cut-throat competition wrecked ships, broke their owners, and provided notorious series of fights for the settlers to witness and cheaper and cheaper rates for passengers and freight. The first great movements of settlers into the Oregon Territory, now the three states of Oregon, Washington, and Idaho, depended on these boat lines, and they all centered near the base of the great natural funnel at Portland, as the terminus of a watergrade through the mountains to the sea and the only one on the Pacific Coast of the United States save San Francisco Bay. Men of finance made fortunes and lost them in these boating ventures and the successful ones left their heritage as a part of a group who founded the city of Portland, and molded Oregon into a state.

Pioneer Steamboats and Skippers.

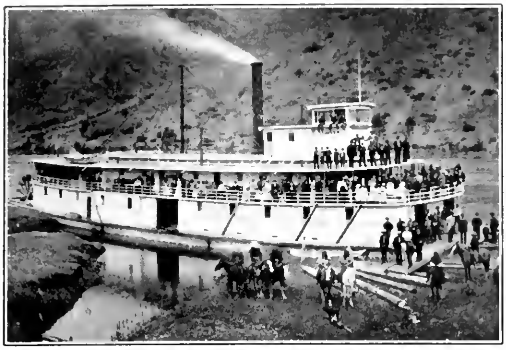
From the date of discovery of the Columbia River, May 11, 1792, by Captain Robert Gray, until 1850, navigation was confined to the river below the Cascade rapids, near the western end of Columbia River Gorge, principally below Portland and Vancouver. In 1835 the famous steamer Beaver, a weird looking craft with two huge paddle wheels and a tall, slim black stack, was built in England and sent round Cape Horn to do general coastwise work for the Hudson's Bay Company, from Sitka, Alaska, to southern California. She entered the Columbia river in 1836, but then only for a few trips. The little 90-foot steamer Columbia, built on the shores of the river which gave her a name, made her trial trip on July 13, 1850, out of Astoria. Her life was short, as she was dismantled in 1852 at Vancouver, Washington. She was 90 by 16 by 4 feet dimensions, with 8 by 24-inch simple engines. The old Beaver was 101 by 20 by 11 feet, and did yeoman duty along the Pacific Coast until she was wrecked in Burrard Inlet, Vancouver, British Columbia, in 1888. The Columbia was a double-ender and ran between Astoria and Portland. Next followed the Lot Whitcomb, a side-wheeler 160 by 24 feet, launched in December of 1850. Following her the Jason P. Flint, a small propeller boat, reputed to be the first of its kind on the Columbia, was built on the river below the Cascades in 1851. She was hauled over the Cascade Rapids and did service between the Cascades and The Dalles as the first up-river boat to ply the stretch of water between the two famed rapids of the middle-Columbia, but later ran between the Cascades and Portland, while the newer steamers Mary and Hassalo were built in 1853 and 1857, respectively, to run between the Cascades and The Dalles.

The steamer Wasco was built above the Cascades in 1854 and also the Eagle, assembled from ready made parts above the Cascades for service between there and The Dalles. Portages of these two rapids were at first made by teams and wagons, where all freight and passengers piled out and went around the rapids to boats plying further upstream, to the next bad spot in the channel. Next followed the Colonel Wright, built above The Dalles in 1858-59 for service between the head of The Dalles at Celilo, to Fort Walla Walla as a freight boat, hauling settlers to the famed wheat belt on the benches above the rivers. In 1861 the Colonel Wright





(Upper) Old portage railroad around the Celilo Rapids, running from Big Eddy to Celilo and connecting with the steamers at each end. (Lower) Steamer Hassalo, first boat built for the O. W. R. & N. coming up the Cascade Rapids of the Columbia in 1888.



—Photo by courtesy of J. Howard Howe, Lewiston, Idaho

Famous old steamer Almota built for the middle Columbia-Snake river run in 1876 at Celilo. She is shown here tied up to the bank of the Snake river with a crowd of passengers bound for Lewiston.

ran up the Clearwater River above Lewiston, Idaho, to Orofino, at the head of navigation, near the foothills of the Rockies, during the mining rush. The Colonel Wright was the first boat to navigate the Snake River from Pasco to Lewiston.

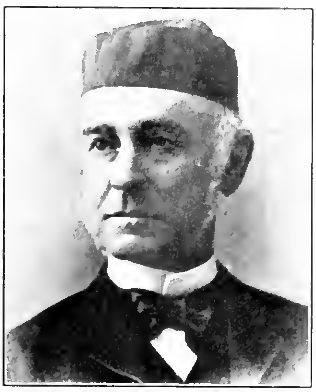
Daniel and Putnam Bradford, financed by Jason P. Flint of San Francisco, built the first portage railroad around the Cascades in 1851, laying a narrow-gauge track with 6 by 6-inch fir stringers faced with strap iron. This was known as the Oregon Portage Railroad; and the first locomotive was a tiny engine built at the Vulcan Works, San Francisco, and delivered by boat. A rival line was built on the opposite side of the river to aid rival steamer lines. Portage at The Dalles was made by team until the portage railroad was finished in 1862, later becoming a part of the Oregon-Washington Railroad and Navigation Company, a subsidy of the Union Pacific System. Many years later, in this varied, checkered and competitive era, the State of Oregon attempted to revive transportation around these rapids, which are about nine miles long, by constructing a portage railroad from Big Eddy to Celilo and later, in 1910, extending it to The Dalles. This railroad was opened with great pomp, governors of three states attending, and much promise was held for the future. Two small steamers were used in connection with the portage railway.

Lewiston, Idaho, was founded about 1860; and in 1862 settlers had already begun flocking to the gold mining area on the Salmon River, requiring four new steamers to be built to handle the traffic. In 1864 the river fleet consisted of about a dozen steamers, generally around 160 feet in length, and about 30 foot beam, carrying their maximum load on 3-foot draft. These boats were all on the upper river.

In 1864 the boats carried thirty-six thousand passengers between Lewiston and Celilo. The trip between Portland and Lewiston was made in from three to four days, while the down trip took from two to three days. In 1911 competition and the new canal at Cascades and the railroad at Celilo speeded up travel so it was possible to make the trip down in about one day.

Navigation above Celilo declined rapidly from 1866 to 1870, and most of the boats were taken to the lower river. Between 1883 and 1885 a number of steamers were built on the upper Columbia near the long chain of lakes in British Columbia.

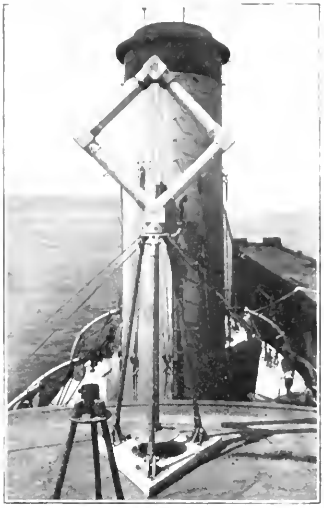
Meanwhile, in 1860, the famous Oregon Steam Navigation Company was founded to master the river transportation system, which it dominated for nineteen years and eventually, by absorbing the various competing lines, even got a grip on the Willamette River, and control of the locks over the falls at Oregon City. The Peoples Transportation Company, monopolizing the river for a time after its organization in 1862, was later absorbed by the Oregon Steamship Company, one of Ben Holliday's many transportation ventures. Later, however, in 1875, after countless battles back and forth, the Oregon Steam Navigation Company, under Captain J. C. Ainsworth, its first president, bought out the Willamette River Transportation Company, capitalized at $1,000,000, with most of the stock being held by the parent company. This move gave the Oregon Steam Navigation Company the dominating grip on the entire upper Columbia River, Snake River, and the lucrative short-haul on the Willamette River south of Portland, and built this company to a fleet of twenty-seven fine river steamers, operating over every lucrative route. Such was the size of this famed company when it was sold to Henry Villard and his interests in 1879, for $5,000,000.



Captain J. C. Ainsworth, first president of the Oregon Steam Navigation Co.

Steamer Beaver, built for Puget Sound service in 1835 and shipped around the Horn, made a few trips up the Columbia in 1836.

Putting Wireless to Its Full Use in Navigation



Dealing with Methods of Utilizing Wireless Installations to Their Full Possibilities and Including Concise, Valuable Data for Mariners and Ship Owners

By Hector MacDonald Hassell*

FEW mariners in the coastal and offshore routes realize the extent to which the various radio services can be utilized in the navigation of their vessels. For too long radio has been looked upon as a facility to be put to work only in times of emergency, whereas its best and highest use is in the prevention of such an emergency. However, in the experience of a well handled ship, such emergencies seldom arise, and still, by an intelligent use of the radio equipment, operating costs can be lowered and schedules expedited to a marked degree.

The great versatility and extreme accuracy of radio's latest aids to navigation are daily being strikingly demonstrated. Bearings taken with the radio compass (or radio direction finder) during thick or foggy weather are found to have the same degree of accuracy as sight bearings in clear weather and, further, are accurate for distances up to several hundred miles. Stopping and starting a vessel costs money. Slowing her down throws her off schedule and neutralizes the value of costly advertising.

A familiar example is the H. F. Alexander on her regular run on the Pacific coast, approaching the Yale or Harvard, two other fast turbine steamers, the courses of both vessels enveloped in dense fog but proceeding without hesitation. The ships are approaching each other at a combined speed of 42 knots.

Knowing the time the Harvard leaves Los Angeles northbound, while the vessels are still some distance apart, the master of the H. F. Alexander orders his radio operator to get in touch with the Harvard and prepare to exchange signals. As the two ships bear down on each other radio bearings are taken in rapid succession. The Harvard is observed to be dead ahead. While still at a safe distance courses are quickly changed, the Harvard hauling in as the H. F. Alexander hauls out. With no slackening of speed the two ships pass each other safely and are thus enabled to keep their rigorous schedules with ease.

On the author's desk at the present writing lies a chart showing the course of the H. F. Alexander as she approached San Francisco Bay on a recent trip. Running southbound she encountered a dense fog just below Point Reyes. Immediately cross radio bearings were taken on the Farallon Islands station, simultaneously with the beacon on the San Francisco lightship. At this point soundings were also taken. Proceeding on the same course a few miles farther, radio bearings were again taken on the lightship and islands and showed they were headed for a point too close inside the lightship. The course was then changed, and frequent bearings were taken on the lightship's beacon until it was brought abeam and then several points abaft the beam. The course was then changed for Point Bonita, setting the ship by radio compass bearing directly over the stern 180 degrees with the lightship. On proceeding a short distance farther the fog lifted and revealed Point Bonita dead ahead, thus checking the radio bearing.

Radio compass stations on shore are radio stations equipped with apparatus which enables them to ascertain the direction from which radio signals transmitted from a ship emanate. Briefly stated, a ship requiring a bearing calls up the radio station or stations from which it is desired to receive a bearing. The station or stations reply directing the ship to send a characteristic signal for a certain period of time, on the conclusion of which the station or stations will signal the bearings (true) of the ship from the station.

The accuracy with which bearings can be taken depends on various conditions, but in general the bearings taken by a station within its sector of calibration can generally be considered accurate to within two degrees. It is, however, pointed out that if at least three radio compass stations can be employed and if they are so situated as to give intersecting bearings, considerable reliance can be placed upon the result of three simultaneous bearings thus obtained, provided that the "triangle of error" formed by the intersection of the bearings is small. This "triangle of error" is formed when the bearings of three or more stations do not meet at a fixed point. When this happens, the geometric center of the triangle can be taken as the position of the vessel.

*Formerly Senior Radio Officer, Steamship H. F. Alexander.

It must be borne in mind that it is impossible for the majority of existing radio compass stations to distinguish between a bearing and its reciprocal; i.e., there is always a possible error of 180 degrees. Also, in the case of bearings which cut the coastline at an oblique angle, errors of from 4 to 5 degrees have been reported. Bearings signaled as "Approximate" "Second Class" should be treated with grave suspicion, as considerable error may exist in such bearings.

The arc of calibration is the sector of a circle in which the station is prepared to furnish bearings: the bearings are true from the station (clockwise). Compass bearings are reliable only when they fall within the calibrated arcs.

The above facts apply to radio compass stations established on shore for the purpose of taking bearings on any vessel equipped with a radio telegraph set tuned to the correct wavelength.

There are several types of radio compasses afloat. All ship board installations in common find the direction of an incoming wave by revolving a loop antenna with respect to the direction of the wave. A pointer, moving with the loop, is mounted over either a Sperry gyro-repeater, a navigational compass, or a dummy compass card; and bearings are read directly therefrom. The shipboard radio compass therefore functions in a manner similar to the pelorus; in fact, it has been called "the fog penetrating pelorus," as it works entirely independent of conditions of visibility. Although accurate and serviceable, particularly at distances within a few hundred miles, a ship approaching a coastline having traveled in foggy or overcast weather for days can make a landfall frequently as far as 1500 miles off shore.

It is to show the many kinds of uses to which both these kinds of stations (land and ship), together with other valuable radio services, can be put that this article is intended.

The United States navy maintains all the radio compass stations ashore in this country. In order to keep a high state of efficiency, all vessels are invited to use them freely in obtaining radio compass bearings at all times except the first ten minutes of each hour in clear weather. There is no charge for the service. Mariners are particularly urged to take bearings during clear weather and when within sight of the station. Visual bearings can be taken simultaneously. In this way they will become familiar with the service and the degree of accuracy and dependableness to be expected at other times.

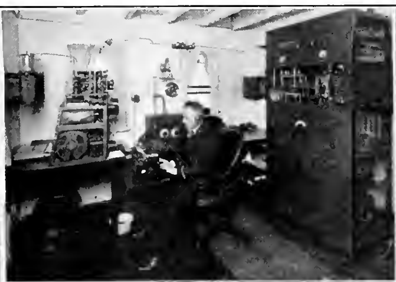
While these bearings should not lead a mariner to neglect other precautions, such as the use of the lead, they will greatly reduce the dangers to mariners who are compelled for any reason to proceed during foggy or misty weather.

Land radio compass stations are divided into two classes: (a) Single stations operating independently and furnishing a single bearing; (b) Harbor entrance groups. All stations in harbor entrance groups are connected to and controlled by the master station; all stations of the group take bearings simultaneously and these bearings are transmitted to the ship requesting them by the control station.

For the use of vessels possessing a ship board radio compass the United States government has established a vast cordon of radio beacons covering the entire coastline of continental United States. This service is now almost complete; and at date of writing practically every lightship and a large number of light stations on our coasts are broadcasting characteristic signals audible in any kind of weather over a distance of 100 to 200 miles. The radio beacon service has crept in rapidly and silently and almost completely, all in the space of the last four years. Other countries have aso fallen in line in the matter of radio beacons with the result that vessels can navigate in any kind of weather with great facility, being enabled to fix their positions accurately from time to time by taking bearings on lightships and light stations which send a characteristic signal and whose positions are known.

The radio beacon has great value in that hundreds of vessels can take bearings on one beacon at the same time. They are in constant operation during foggy or overcast weather and perform an exceedingly useful service at such times. Little can be learned as to how much these beacons are used by reason of the fact that each bearing taken on them is taken silently and unknown to other vessels and even to the beacon station itself.

A new departure in the radio beacon service is the new Kolster mobile beacon designed for shipboard installation. The entire unit composing this beacon is only 24 inches high, 15 inches wide, and 12 inches deep. It is mounted on a bulkhead or can be placed on a table. The front panel contains a power control knob and a snap switch for starting the beacon. Once set,



(Center) A well equipped radio room on a modern passenger liner. (Right and left) Installations in pilot house and chart room for taking radio compass bearings.

the power control knob is not again disturbed. It is then only necessary to turn the snap switch to start the beacon operating.

Vessels finding themselves suddenly enveloped in fog can switch on their beacons permitting bearings to be taken on them, thus warning others of their presence.

The almost universal use of radio at sea has rendered largely unnecessary the need for determining from a single set of observations whether a storm exists that is likely to effect a vessel, and, if so, to locate its center and the direction in which it is moving. This is particularly true of the coastal waters of the North Atlantic and North Pacific oceans and the regions frequented by tropical cyclones. Through the agency of various meteorological services the centers of nearly all storms or depressions are promptly located and information respecting their intensity and probable future movement is broadcast at short intervals.

One of the best sources of this kind is the French ship Jacques Cartier (call sign FTJ), belonging to the Campagnie Generale Transatlantique. This vessel conducts a weather forecast service during its voyages across the North Atlantic between France and the United States under the auspices of the Office National Meteorologique of France. The following notice has been issued regarding this undertaking:

A meteorological service, embracing the collection on the high seas of observations from ships, the retransmission of the latter to the continental meteorological offices, the daily preparation of forecasts and their dissemination by radio for the benefit of all vessels cruising within the range of the Jacques Cartier, has been organized by the Office National Meteorologique and the Campagnie Generale Transatlantique.

This service has the official approval of the International Meteorological Committee. Vessels should endeavor to forward to the Jacques Cartier meteorological observations, either direct or by relaying. The Jacques Cartier collects ships' weather reports; broadcasts weather information, storm warnings, and forecasts for the main North Atlantic routes.

The shore stations of the United States Navy also have a highly organized system of disseminating general navigational information. These stations are appointed at regular intervals on both coasts. They are the most powerful of those possessed by the Navy and are located in such a manner that all vessels running coastwise or approaching the coast from any quarter will be enabled to receive these warnings with ease. On the East coast these stations are: Boston, Newport, New York, Philadelphia, Washington, Norfolk, Charleston, Colon, Panama.

On the West coast they are San Francisco, Eureka, Astoria, Puget Sound Navy Yard at Bremerton.

These radio stations transmit important hydrographic notices immediately upon their receipt at the station, also at certain specified times, depending upon their urgency, also upon request. Generally speaking, the information includes particulars of derelicts and wrecks dangerous to navigation, lights temporarily extinguished, displacements of buoyage, beacons, and other navigational aids.

The radio service furnished by the North Atlantic International Ice Patrol is also very valuable indeed and attention will be called to it here. Broadcasts are

	Station	Latitude deg	min	sec		Longitude deg	min	sec		Arc of calibr. deg		deg
	Bar Harbor, Me. (NAC)	44	18	48	N	68	11	40	W	63	to	243
	Cape Elizabeth, Me. (NAB)	43	33	59	N	70	11	59	W	30	to	210
Boston Bay Group	Thatchers Isl., Mass. (NBE)	42	38	10	N	70	34	45	W	320	to	240
Boston Bay Group	Deer Isl., Mass. (NWM)	42	21	16	N	70	57	29	W	10	to	190
Boston Bay Group	Fourth Cliff, Mass. (NBF)	42	09	40	N	70	42	22	W	330	to	160
	North Truro, Mass. (NAF)	42	02	23	N	70	03	37	W	210	to	160
	Surfside, Mass. (NBS)	41	14	39	N	70	05	53	W	0	to	360
	Prices Neck, R. I. (NBO)	41	27	04	N	71	20	16	W	0	to	360
	Amagansett, L. I. (NBE)	40	58	10	N	72	07	27	W	29	to	222
New York Entrance Group	Fire Is., N. Y. (NJY)	40	38	07	N	73	12	32	W	88	to	260
New York Entrance Group	Sandy Hook, N. J. (NHD)	40	27	54	N	73	59	50	W	0	to	162
New York Entrance Group	Manasquan, N. J. (NFZ)	40	07	05	N	74	01	58	W	24	to	166
Delaware Bay Group	Cape Henlopen, Del. (NSD)	38	47	23	N	75	05	25	W	0	to	260
Delaware Bay Group	Cape May, N. J. (NKC)	38	55	55	N	74	54	34	W	40	to	240
Delaware Bay Group	Bethany Beach, Del. (NBN)	38	32	45	N	75	03	22	W	0	to	200
Chesapeake Bay Group	Virginia Beach, Va. (NCZ)	36	51	10	N	75	58	33	W	355	to	160
Chesapeake Bay Group	Poyner's Hill, N. C. (NDX)	36	17	16	N	75	47	48	W	0	to	160
Hatteras Group	Cape Hatteras, N. C. (NDW)	35	15	59	N	75	31	16	W	30	to	220
Hatteras Group	Cape Lookout, N. C. (NAN)	34	36	11	N	76	32	18	W	40	to	230
Hatteras Group	North Island, S. C. (NZW)	33	13	18	N	79	11	10	W	40	to	320
	Folly Island, S. C. (NZV)	32	41	00	N	79	53	22	W	30	to	210
	Jupiter, Fla. (NAQ)	26	56	54	N	80	05	02	W	356	to	144
	South Pass, La. (NBX)	29	00	43	N	89	09	36	W	81	to	237
	Galveston, Tex. (NKB)	29	20	01	N	94	45	13	W	30	to	205
	Colon, C. Z. (NQB)	09	22	31	N	79	56	58	W	270	to	60
	Cape Mala, C. Z. (NGR)	07	28	17	N	79	59	55	W	0	to	235
	Imperial Beach, Calif. (NPL)	32	35	14	N	117	07	54	W	164	to	344
	Point Fermin, Calif. (NPX)	33	42	19	N	118	17	37	W	65	to	330
	Pt. Hueneme, Calif. (NCA)	34	08	43	N	119	12	12	W	106.5	to	307.5
	Pt. Arguello, Calif. (NPK)	34	34	38	N	120	38	22	W	111	to	353
San Fran Entrance Group	Pt. Montara, Calif. (NLH)	37	32	05	N	122	31	04	W	178	to	356
San Fran Entrance Group	Farallon Island, Cal. (NPI)	37	41	58	N	122	59	56	W	0	to	360
San Fran Entrance Group	Pt. Reyes, Calif. (NLG)	38	02	12	N	122	59	26	W	120	to	12
Humboldt Bay Group	Eureka, Calif. (NPW)	40	41	46	N	124	16	24	W	215	to	17
Humboldt Bay Group	Pt. St. George, Calif. (NYW)	41	47	00	N	124	15	05	W	177	to	12
	Empire, Ore. (NPF)	43	22	01	N	124	18	31	W	210	to	5
Columbia River Entrance Group	Fort Stevens, Ore. (NQR)	46	11	49	N	123	58	21	W	180	to	12
Columbia River Entrance Group	Klipsan Beach, Wash. (NLS)	46	27	53	N	124	05	16	W	155	to	245
	Destruction Isl. Wash. (NBG)	47	40	30	N	124	29	00	W	0	to	360
	Tatoosh Island, Wash. (NPD)	48	23	25	N	124	44	05	W	165	to	65
Juan de Fuca Str. Group	New Dungeness, Wash. (NFT)	48	10	22	N	123	07	56	W	240	to	120
Juan de Fuca Str. Group	Smith Island, Wash. (NPH)	48	19	04	N	122	50	39	W	0	to	360
Juan de Fuca Str. Group	Cattle Point, Wash. (NFN)	48	27	06	N	122	57	45	W	120	to	270
	Pachena Point, B. C. (VAD)	48	44	00	N	125	06	20	W	108	to	320
	Soapstone Pt., Alaska (NOW)	58	05	40	N	136	29	50	W	145	to	45
	St. Paul Isl. Alaska (NPQ)	57	07	18	N	170	16	37	W	50	to	302
	Cape Hinchinbrook, Ala. (NRM)	60	14	10	N	146	39	07	W	110	to	320
	Whitefish Pt., Mich. (NQT)	46	46	19	N	84	57	22	W	275	to	180
	Eagle Harbor, Mich. (NUG)	47	27	53	N	88	08	43	W	270	to	75
	St. John, N.B. (VAR)	45	15	04	N	66	00	47	W	30	to	200
	Yarmouth, N. S. (VAU)	43	46	24	N	66	07	16	W	190	to	280
	Chebucto Head, N. S. (VAV)	44	30	01	N	63	31	20	W	75	to	180
	Canso, N. S. (VAA)	45	19	11	N	60	58	06	W	60	to	110
	St. Paul Isl. N. S. (VAT)	47	12	15	N	60	08	45	W	0	to	360
	Cape Race, Newf'lnd. (VAL)	46	39	10	N	53	05	05	W	30	to	260
	Belle Isle, " (VCM)	51	52	54	N	55	21	41	W	45	to	325

List of North American radio stations sending out information of interest to mariners.

sent by the patrol at the following times. (G.M.T.) 1100, 2300, 0000, 1200, 0030. For the purpose of carrying on the international ice observations and ice patrol service provided for by the International Convention for the Safety of Life at Sea, London, 1913-1914, two United States Coast Guard cutters have been detailed for this service. The object of the ice patrol is to locate icebergs and field ice nearest to the North Atlantic lane routes. These vessels determine the southerly, easterly, and westerly limits of the ice and keep in touch with these fields as they move to the southward. Broadcasts are sent five times daily at the times indicated above. Each message is sent three times with intervals of two minutes each to insure certain and accurate reception.

And now, in conclusion, any one of the pieces of radio equipment named—the mobile radio beacon, the radio compass, or the ship's regulation radio telegraph apparatus—is worth its weight in gold when used intensively solely on the score of saving in time and consequently in operating costs which it makes possible. To this consideration is added that of the extra insurance against loss of life and property.

Every year sees an increase in the number of radio compasses and other modern radio aids to navigation installed aboard ship; and every year we see a lessening in the costs of operation of vessels which use this equipment to its full extent. The navigator who today is abreast of the times—and does not present an impervious front to new ideas, but uses effectively the radio apparatus that his ship possesses, will find the efficiency of his vessel increased twofold.

Little has been said herein about time signals and the ordinary service of message transmission to and from vessels at sea. The latter is well used and efficient. The former is now thoroughly familiar to all mariners who daily check their chronometers by signals received from the United States naval observatories and other government stations throughout the world. No further comment on these is necessary. The thought the author wishes to emphasize is that those engaged in the navigation of vessels should make use of all the radio services available to the mariner. Operating costs will thereby be reduced a marked degree.

The Walking Payroll

Some Observations Intended to Assist Industrial Management

By Letson Balliet, Constructing Engineer

SELDOM does a manager or superintendent compute the actual cost of his failure to have the tools and materials in the right place at the right time. Workmen do not plan or manage a job. They merely meet the job as it is laid down to them. They work with the materials, the tools, and the equipment supplied. They work under the conditions and within the time specified. Workmen are time salesmen, selling eight hours of their time, or occasionally a little "over time" at a higher price. The manager who merely buys his workmen's time, gets his money's worth if the workmen put in their full eight hours; but the equipment, tools, materials, and conditions are the boss' job, and no organization is any more efficient that its head.

There are 480 minutes in an 8-hour day. A workman drawing 60 cents an hour ($4.80 a day) is being paid **one cent a minute.** To send him to the toolroom or storehouse with an order for a monkey wrench or a piece of material takes one-half hour out of his day. It is **one sixteenth** of his time, or a 6 per cent. loss. It costs 30 cents to get that monkey wrench to the place where it should have been had the chief engineer or manager done his part of the job rightly. Of course the manager or engineer can "pass the buck" and lay the blame on the foreman of the job. But who picks out the foreman, hires him, and keeps him on the job?

If he has a monkey wrench or a pipe wrench that "slips" on its work, it is discarded. Why not discard a foreman who "slips" on his work? The manager has to supply the equipment, the tools, and the foreman; so the 6 per cent. loss is really the manager's fault.

Often a man will make more than one trip for tools or material in a day. Sometimes other men are delayed by waiting till his return. These trips delay the progress of plant output because other parts of the work cannot progress until this part is finished and ready.

In a busy factory or industrial plant, a count of the number of men walking around the plant will show the average part of the payroll that is performing with shoe leather what the manager failed to do with his brain. That is what is meant when we hear the expression that a manager has a "shoe leather brain." I wouldn't be very proud to show visitors through a mine or a plant with a quarter of my payroll walking around to do something I had failed to do. Shoe-leather payroll is a sign of inefficiency. If the whole line of Mr. Ford's automobile plant were held up while one workman went to hunt up a nut or a wrench, the cost of that walk would certainly be more than 30 cents.

Let us assume that a hypothetical plant would produce 100 units of its product daily at a cost of $5 per unit. The daily operating costs would then be $500. If each workman put in but 6 per cent. of his time on the shoe leather job, the output of the plant would be reduced to 94 units with the average cost increased to $5.31 per unit. Suppose the contract or sale price in the market was $6 per unit. In that event the profit would be reduced from one dollar to 69 cents, or a 3 per cent. loss in profit. If the job is figured at 20 per cent. profit ($1 on a $5 cost), we find that the profit is reduced to 13 per cent. (69 cents on $5.31 cost).

I stood one day in the gallery overlooking a factory making steel automobile frames, where 2000 frames a day were made and corded up like cordwood with hardly a touch of human hands. More than four frames were completed every minute of the 480 minutes in a day; and by counting the number of men directing the machinery and cranes in their motions I found that there were 8 frames per hour per man on the payroll, or 7½ man-minutes were required on each frame. The manager of the plant said, "It is a good plant, but damn poor engineering. There are too many men." However there were no men walking around that plant. Materials came into the plant on conveyors, they passed through rolls, bulldozers, gang punches, and presses at exactly the right second. Different members came together at the right time and passed on. That's the story of equipment and sequence of material and motions.

When a walking payroll is required to cover deficiencies in sequence of materials and tools, the costs are too high and contracts are lost.

Marine Refrigeration Simplified

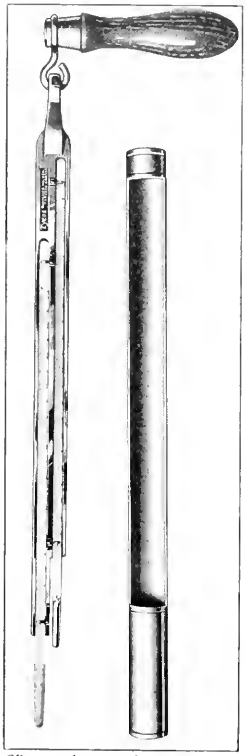
A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part II—Fundamentals

By L. L. Westling

IN the first installment of this series on Marine Refrigeration Simplified, we followed the development of the demand for modern marine refrigerative facilities and showed the necessity for a fundamental knowledge of the subject on the part of marine operatives. In this section we deal with some of the fundamentals of the thermodynamic laws underlying refrigeration, particularly as applied aboard ship.

Refrigeration is a branch of thermodynamics or heat engineering and deals with the transfer of heat. In treating the subject, it is necessary to consider the terms or units around which the refrigeration plant is schemed, designed, and applied. The yard sticks of heat transfer are the units of heat, of time, of area, and of temperature.



Sling cyclometer for measuring humidity (Courtesy Taylor Instrument Co.)

No definition is necessary for units of area, temperature, or time, but the unit of heat should be made clear as a quantitative term. The unit of heat with which the engineering fraternity deal is called the British Thermal Unit and is defined as that quantity of heat required to raise one pound of water from 62 degrees to 63 degrees Fahrenheit. For all practical purposes it may be stated as the heat quantity required to raise one pound of water one degree Fahrenheit.

Sensible Heat

The term "heat" is loosely applied by the layman and is often misunderstood, there being two very distinct meanings. There is "sensible heat," which is represented by temperature and is a relative term, and is analogous to pressure in heat transfer. It indicates the direction in which the heat will flow. As an illustration, if a piece of steel is placed in a flame it takes on a condition which is said to be hot. This represents a sensible heat, for if one touches it a sensation is felt by the flow of heat to the body of the observer. But if the hot piece were placed into surroundings of colder temperature, a rise of temperature of the enclosing medium would result with the absorption of a quantity of the heat. To be more specific, let us assume that the piece at a temperature of 300 degrees Fahrenheit was immersed in a bath of 100 pounds of water. The temperature of the water was raised from 60 to 80 degrees Fahrenheit. This provides the factors in the definition of quantity heat, or the British Thermal Unit, and is calculated thus:

$100 \times (80^\circ - 60^\circ) = 2000$ B.T.U.

Specific Heat

It is quite within the understanding of all that were the bath composed of oil, or mercury, or any liquid other than water, the same degree of temperature rise could not be expected. This obviously involves another factor, which is called specific heat. The specific heat of any material is the quantity of heat necessary to raise the temperature of one pound of the substance through one degree Fahrenheit. Reviewing the definition of the British Thermal Unit, it is obvious that the specific heat of water is 1.00. Water is the arbitrary basis accepted in science for specific heat values, and all values determined for other substances are taken as relative or comparative to water.

Substance	Specific Heat	Substance	Specific Heat
*Air	.2374	Ice Cream	.78
Apples	.92	Iron	.109
Beef, lean	.77	Lard	.54
Beef, fat	.72	Lead	.032
Berries	.42	Mutton	.810
Butter	.55	Milk	.90
Cabbage	.93	Mercury	.0331
*Carbon Dioxide	.2169	Oysters	.84
Carrots	.87	Petroleum	.510
Cheese	.64	Pork	.510
Cream	.90	Poultry	.800
Eggs	.76	Veal	.70
Fish	.82	Water	1.00
Ice	.504	*Water Vapor	.420

*at zero pressure gauge.

To illustrate further, if 100 pounds of the following materials had a temperature change of 20 degrees, the heat absorbed would be calculated by the formula:

Weight x specific heat x temperature change the answer being:

*Air	474.8 B.T.U
Beef	1540. B.T.U.
*Carbon dioxide	433.8 B.T.U
Ice	1004. B.T.U
Iron	218. B.T.U
Lead	64. B.T.U.
Mercury	66.2 B.T.U.
Milk	1800. B.T.U.
Petroleum	1020. B.T.U.
Water	2000. B.T.U.
*Water vapor	840. B.T.U.

The same calculations hold for either rise or fall of temperature. In the example of the piece of steel, the heat gained by the water equalled the heat given off by the steel (neglecting radiation) and the process is in reality a refrigeration of the steel, although the change took place at a temperature range that we do not usually associate with refrigeration.

Inverting the calculation, we can determine the weight of the steel. Temperature equilibrium was established between the water and the steel, hence a temperature drop from 300 degrees to 80 degrees, or 220 degrees resulted.

$$W \times S H. \times (T_1 - T_2) = B.T.U.$$

$$\text{then } W = \frac{B.T.U.}{S.H. \times (T_1 - T_2)}$$

$$\text{or } W = \frac{2000}{.109 \times (300-80)}$$

$$= \frac{2000}{23.98} \text{ lbs.} = 32.91 \text{ lbs.}$$

Heat Transfer

The calculation of refrigeration loads involves the removal of heat from two sources; first, from the materials being transported or preserved, and, secondly, from outside sources or leakage. The heat that is given off by the cargo involves the specific heat values, such as illustrated in the foregoing paragraphs; but the heat that comes through the insulation involves factors of heat transfer, which values are peculiar to the materials enclosing the space.

The amount of heat transmitted through any material varies with the area exposed; with the temperature difference on the two sides; with the period of time; with a factor peculiar to the material used; and inversely with the thickness of the transmitting materials. With these variables arbitrary figures may be used in the establishment of a coefficient, or constant, excepting that which represents the characteristic of the substance. This constant, called the coefficient of conductivity, is based upon one inch of thickness of the solid material, upon one square foot of exposed surface, and one hour of time. (Some tables are in terms of one day and care must be exercised to avoid error.) The values have been experimentally determined and the table reproduced herewith illustrates them.

CONDUCTIVITY TABLES

Insulator	B.T.U. per hour through 1 sq. ft. surface, 1 in. thick per degree difference on opposite faces.
Air	.175
Asbestoe fire felt	.444
Alotex	.330
Cement, Portland	2.061
Cement wood (cement and sawdust)	.928
Charcoal	.348
Corkboard, natural binder	.305
Corkboard, bituminous binder	.3513
Cork, granulated	.3225
Copper	2094.
Hair felt	.246
Insulite	.296
Kapok	.238
Magnesia(85 per cent.)	.510
Mineral wool (slag)	.2614
Oak, gross grain	1.016
Pine, cross grain	.2555
Pine, yellow, cross grain	1.045
Peet (dry)	.4074
Rice Hulls	.667
"Rock Cork" (mineral wood and binder)	.328
Wool felt	.508
Sawdust	.4063
Steel	322.4
Vacuum	.004
Water	4.166
Frost on coils	3.130

Assume that an oak enclosure having two square feet of surface and walls ½-inch thick separates spaces of 200 degrees and 40 degrees, respectively, the temperatures remaining constant. The amount of heat transmitted in one hour would be:

$$\frac{\text{Area x Temp. difference x time x a constant}}{\text{thickness}} = \text{B.T.U.}$$

$$\frac{2 \times (200-40) \times 1.0 \times (c=1.016)}{\frac{1}{2}} = 650 \text{ B.T.U.}$$

The value of this formula is apparent in the calculation of refrigeration loads.

Heat and Energy

One of the most important of the laws of thermodynamics that bear upon refrigeration is that "heat and mechanical energy are mutually convertible." That is to say, heat requires for its production, or produces by its disappearance, mechanical energy to the proportion of 778 foot-pounds for one B.T.U. This law shows the bond between power and heat removal, or mechanical refrigeration. This value has been determined experimentally and is not an arbitrary one. In the example of the steel in water, the 2000 B.T.U., as transferred, had an equivalent energy value of 2000 x 778, or 1,556,000 foot-pounds. In other words, neglecting loss by radiation, the same results could have been obtained by expending upon the water, say by agitation, 1,556,000 foot-pounds of energy. If, however, in reversal of process, the same amount of energy was to be removed from the water, the accompanying temperature drop would have been 20 degrees. This is a refrigeration process.

Latent Heats

In the changing of temperature of substances there are points at which a change of state occurs, that is from gas to liquid, liquid to solid, or vice versa. It has been experimentally proved that in these changes of state a wide variation of heat capacities takes place without a change in temperature. These phenomena are called "latent heats," and each substance has its own characteristic values in terms of B.T.U. To clarify, we will use the most familiar substance subject to such changes—water. Assume that 10 pounds of water at atmospheric pressure and a temperature of 42 degrees Fahrenheit was cooled to a temperature of 32 degrees Fahrenheit. The heat extracted would be:

Weight x $(T_1—T_2)$ x specific heat=
10 x 10 x 1 100 B.T.U.

Should heat continue to be removed from the water it would change to ice; and could we measure the heat removed we would find it to be 1440 B.T.U. This change of state without a change in temperature is due to the factor known as the "Latent Heat of Fusion" and its apparent value is 144 B.T.U. per pound.

To further illustrate, assume the 10 pounds of water at atmospheric pressure stood at 180 degrees Fahrenheit. Additional heat was applied until it had a temperature of 212 degrees Fahrenheit. The quantity of heat absorbed by the water (neglecting radiation) was:

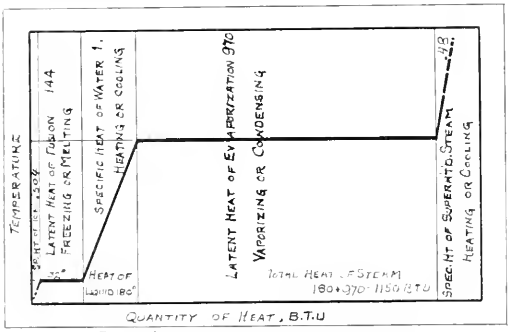
Weight x $(T_1—T_2)$ x specific heat=
10 x 32 x 1=320 B.T.U.

More heat is applied and all is evaporated. The heat absorbed would be found to have been 9700 B.T.U. and no temperature change would have resulted. This was due to the factor known as the "Latent Heat of Vaporization" and evidently has a value of 970 B.T.U. per pound. This procedure is reversible and should the vapor condense, it must give up its latent heat of vaporization, and should the solid become liquid, it must absorb its latent heat of fusion.

The condensing of steam in a pipe must accompany latent heat loss, and the melting of ice must accompany latent heat absorption.

Each substance has its own characteristic latent heats, and it is immediately apparent that those having a latent heat of evaporization, which appears at workable pressures and at low temperatures, will be of greatest value in refrigeration processes.

Evaporization of liquids takes place at all tempera-



Properties of water at atmospheric pressure.

tures, but the boiling point is the temperature of copious evaporization. Any evaporization is accompanied by the gain in latent heat, regardless of temperature. The following table illustrates these values at atmospheric pressure:

Substance	Latent Heat of evaporization	Boiling Temperature
Water	970 B.T.U.	+212 degrees F.
Anhydrous ammonia	589 "	— 28 "
Sulphur dioxide	172 "	+ 14 "
Ethyl chloride	168 "	+ 54 "
Carbon dioxide	158 "	—108 "

Air Temperature Dry Bulb	Difference in Degrees Fahrenheit Between Dry and Wet Bulb Thermometers										Saturation Grains per Cubic Foot
	1	2	3	4	5	10	15	20	25	30	
0	67	34									.48
4	72	44	17								.58
8	76	54	29	6							.7
12	80	60	40	20							.85
16	83	65	48	30	14						1.05
20	85	70	55	40	26						1.25
25	87	74	62	49	37						1.55
30	89	78	67	56	47						2.
40	92	83	75	68	60	22					2.8
50	93	87	80	74	67	38	11				4.
60	94	89	83	78	74	48	26	6			5.8
70	95	90	86	81	77	55	36	19	4		8.
80	96	91	87	83	79	61	44	29	15	3	11.
90	96	92	89	85	81	65	50	36	24	13	15.
100	97	93	89	86	83	68	54	42	31	21	19.5

Chart for the determination of relative humidities when using a wet and dry bulb thermometer.

A study of this list would indicate which is the more usable as a refrigerant.

It is well within the experience of all that the boiling point will vary with the pressure. Water, for example, at sea level will boil at 212 degrees Fahrenheit, and on top of Pikes Peak it will boil at a temperature of 187 degrees Fahrenheit. In the other extreme, if we were to boil water in a container standing at a pressure of 200 pounds per square inch, a temperature of 366 degrees must be attained before boiling begins. So it is with all liquids and refrigerants; and these pressure effects must be known in the choosing of a refrigerant.

The abstraction of heat from itself by the vaporizing of a portion of the liquid is the basis of one of the earliest forms of refrigeration. Porous vessels or bags containing water were exposed to a circulation of air; and the evaporization effected a drop in temperature. Obviously the drier the air the more rapid the vaporizing and the lower the temperature. It is said that in India the practice is centuries old, and under proper conditions ice crystals have formed. This phenomenon is used in the wet and dry bulb thermometer, or sling cyclometer. The dry thermometer bulb indicates the true temperature, and the cloth enveloped wet bulb shows a lower temperature caused by the vaporizing of the water from its surface. The dryer the air, the more rapid the vaporizing and lower the indicated temperature. Air washing systems utilize this effect, and a near wet bulb temperature is obtained.

Patronize Your Own Ships.—Every one at all versed in economic problems must realize, now as never before, that all of a nation's industries are interdependent, one upon the other, for general success. If the farmer suffers, as he is now, all other industries are affected adversely. If we spend our money in patronizing foreign shipping when American ships are available under equal terms, we must realize that 95 per cent. of the money thus expended is taken from our midst and cannot be used to help other interests. If we spend our money for freight and passage on our own ships, the 95 per cent. is circulated among our own people, to the benefit of a greater variety of domestic industries, than money spent in any other known direction.
(—Bulletin, American Bureau of Shipping.)

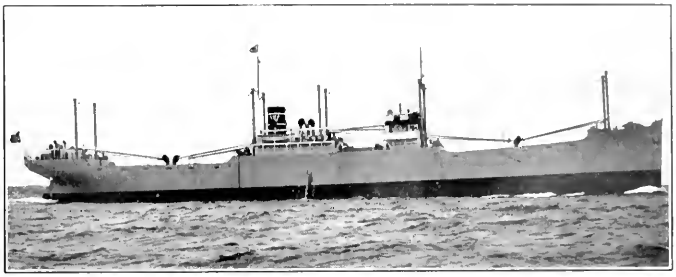
European Shipbuilding in 1930

By R. C. W. Courtney

IN THE future, 1930 will undoubtedly be regarded as marking a very important point in the history of shipbuilding in Europe; in fact it is a difficult matter to find another similar period in which so many outstanding shipping contracts have been completed or begun by the leading maritime nations at the same time. Precedence must, of course, be given to the new Cunarder to be built by John Brown and Company at Clydebank, as this ship and the sister vessel yet to be ordered will mark the beginning of a new era in North Atlantic passenger travel.

Among other noteworthy liners to be completed in Great Britain and Ireland during the past year, special mention must be made of the Fairfield-built Empress of Japan, the largest and fastest transpacific ship, and the Britannic, which has not only the distinction of being the biggest British motor liner, but is also equipped with two of the highest powered diesels yet to be built for marine purposes. Particulars of the 42,000-ton Canadian-Pacific liner Empress of Britain have already appeared in these pages; and other ships of special interest completed or under construction include the 21,000-ton Peninsular and Oriental liners Strathaird and Strathnaver, each of 28,000 shaft horsepower with electric drive; two 14,000 - ton geared - turbine ships for the same owners; the 20,000-ton diesel-driven Winchester Castle and Warwick Castle for the South African service, the first of which was completed in October; and the 17,000-ton quadruple-screw Reina del Pacifico.

The Furness-Bermuda Mid Ocean and the Union of New Zealand coastal liner will also be noteworthy turbo-electric ships, whilst the new Blue Star motor liner Tuscan Star of 11,449 gross tons and 9000 brake horsepower for the South American meat trade has the distinction of having the largest refrigerated space of any ship so far completed, the total capacity being 595,000 cubic feet.



Motorship Minerva built by Burmeister and Wain for the Pacific Coast-Australia service of Wrangell-Pederson. With 2800 indicated horsepower on twin screws, the Minerva when loaded will make a speed of 12 knots using ten tons of fuel per day, or a consumption of 0.32 pound per indicated horsepower for all purposes.

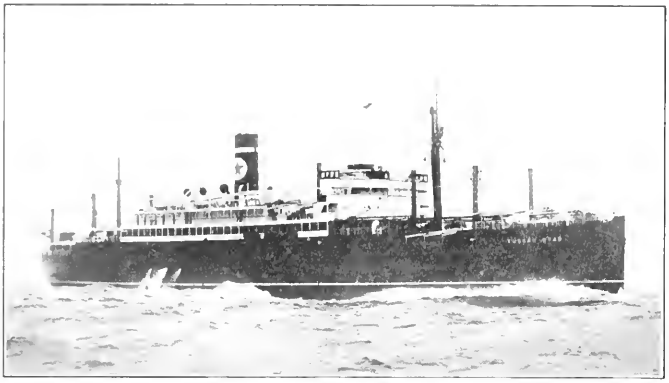
A considerable amount of tanker tonnage has been placed in service; and work of this nature still in hand includes three very large whale oil refining ships, each of about 20,000 tons dead weight, which are being built for Norwegian owners.

Since the commissioning of the Europa high class liner construction has not been a preeminent feature of the German shipyards, as the completion of the two most outstanding post - war transatlantic liners apparently satisfies immediate needs in that direction. At the present time the only important passenger ships still in the builder's hands are two Hamburg South American intermediate vessels, the first of which the Monte Pascoal, has already been launched. The length is 523 feet 9 inches, with a beam of 65 feet 4 inches and a gross register of 14,000 tons. Both the hulls and machinery are being constructed by Blohm & Voss, the latter consisting of four sets of 6-cylinder diesels driving twin screws through a reduction gear, the total power being 6000 brake horsepower for a service speed of 13 to 14 knots. Accommodations will be provided for 2500 passengers in one class.

Another important contract has been the re-engining of the four Hamburg American ships of the Albert Ballin class with high pressure turbines and boilers, and the construction of eight 460 foot 9800-ton, deadweight, cargo steamers to take the original machinery. One of these latter, the Ockermark, is of particular interest as the power plant also includes an experimental Benson type oil-fired boiler which is capable of developing a pressure of no less than 3270 pounds per square inch.

Other work in hand in Germany includes a number of fishing vessels for Russia, several large Krupp-engined tankers for the Standard Oil Company, and two or three high class diesel yachts, also for American owners.

French shipyards have launched or completed several fine ships during the past year, the largest being l'Atlantique, built and engined by the Chantiers et Ateliers de Saint Nazaire Penhoet for the Cie Sud Atlantique. This liner will easily be the largest and fastest trading to South America and is 738 feet in length, with a beam of 91 feet and a displacement of about 38,500 tons. The power plant consists of a four - screw arrangement of Parsons turbines developing 60,000 shaft horsepower, and the completion and trials in the spring of 1931 will undoubtedly be awaited with interest. Several big motor liners have also recently been produced in France, notable examples being the Compagnie Generale Transatlantique quardruple-screw Lafayette of 25,000 tons and 18,500 brake horsepower for the Havre - New York service, and the Mes-



New Blue Star motor liner Tuscan Star which has the greatest refrigerated space afloat.

sageries Maritimes Felix Roussel for trading from Marseilles to the Orient via Suez. This latter ship has been built by the Ateliers et Chantiers de la Loire with dimensions 566 feet by 68 feet by 46 feet 5 inches, and is powered with twin 10-cylinder Sulzer diesels developing a total of 11,000 brake horsepower at 110 revolutions per minute for a service speed of 16½ knots. Four other large motor liners are still under construction for the same owners, of which the Georges Philippar of 21,500 tons displacement is approaching completion.

The most important event in French mercantile shipping, however, is the decision of the Compagnie Generale Transatlantique to proceed with the construction of a very large liner for the New York service which will be by far the largest ship yet built in France. This craft has been in the projected stage for a considerable time but it is understood a definite decision has now been reached and that work will shortly be put in hand. A further Compagnie Generale Transatlantic vessel of about 25,000 tons gross and similar type to the Lafayette is on the stocks at Penhoet for the North Atlantic service, but propulsion in this case will be effected by geared turbines taking steam at 370 pounds from high pressure water-tube boilers.

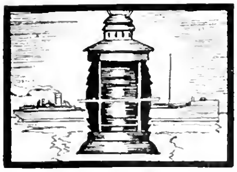
Considerable activity also prevails in the various Italian shipyards; and here again very large and high powered liner tonnage is under construction. Two ships of this description are on order, the Rex of 50,000 tons for the Navigazione Generale Italiana, and the Lloyd Sabaudo Conte di Savoia of 46,000 tons. The former is being built by the Ansaldo Societa Anonima of Genoa-Sestri and will be approximately 870 feet in length. The power plant will consist of single reduction geared turbines and high pressure water-tube boilers developing upwards of 100,000 shaft horsepower for a minimum speed of 27 knots. The Lloyd Sabando ship is under construction at the San Marco yard, Trieste, and will have dimensions of about 800 feet by 95 feet 9 inches by 63 feet, the gross tonnage being 46,000. Propulsion will also be effected by a four-screw arrangement of geared turbines and water-tube boilers, the latter being of the Yarrow high pressure type, and it is understood that a speed in excess of 27 knots is being aimed at. Completion of both vessels should be effected by the early summer of 1932 when Italy will be in a position to make a determined bid for the Atlantic Blue Ribbon.

The other large Italian liners now under construction or on order will all be diesel driven, and include two 22,000-ton quadruple-screw passenger and cargo vessels for the Cosulich service from Trieste to South America, one of which is to be engined by Fiat and the other with Sulzer engines built under license. The total power is to be between 18,000 and 22,000 brake horsepower, and both ships are to be built at Monfalcone yard. The San Marco yard is also building another interesting ship, the Cleopatra, a 21-knotter for Mediterranean service, in which four 4700-horsepower 8-cylinder Sulzer diesels are to be installed. Dimensions are 534 feet by 67 feet 4 inches by 42 feet 5 inches, and it is officially announced that when completed the new liner will be one of the most luxurious afloat.

Cargo tonnage includes some important work for the Standard Shipping Company of New York, of which the 16,000 ton Fiat-engined motor tanker J. A. Moninckel has just been completed at Monfalcone and three 16,200-tonners are on order for the same owners.

The leading Dutch shipyards have also produced some noteworthy vessels, including the Johan van Oldenbarnevelt and Marnix van Sint Aldegarde for the Netherland Steamship Company, and the Baloeran and Dempo for the Rotterdam Lloyd. These ships, which are the largest and most important yet to be built in Holland, were described and illustrated in the October issue of Pacific Marine Review. Another outstanding and distinctly novel vessel is the 9000-ton motor liner Colombia built for the Royal Netherlands Steamship Company's Caribbean service. This ship has dimensions 457 feet by 61 feet 6 inches by 39 feet 6 inches and has been built by the P. Van Smit Junior shipyard at Rotterdam on the Maierform. The propelling plant comprises two Werkspoor pressure - charged, 4 - stroke diesels developing a total of 8000 brake horsepower for 15 knots. Twin balanced rudders are arranged, but the usual Maier overhanging spoon bow has been modified to an orthodox straight stem with the forefoot completely cut away.

The shipyards in Norway, Sweden and Denmark have mainly been concerned with the production of utilitarian freighters and tankers, generally motor driven, the most noteworthy of which from the point of view of size is the East Asiatic Company's India. Built in Denmark by the Nakskov yard, this vessel has the distinction of being the largest motorship yet built in any Scandinavian yard, the dimensions being 488 feet by 63 feet 6 inches by 40 feet 3 inches. The dead weight is 14,000 tons and twin Burmeister & Wain diesels, each of 3750 indicated horsepower, are to be installed for a service speed of 13½ knots.



Marine Equipment

REMOTE CONTROL — AIR OSCILLATORS
TOW BOATS — C O 2 RECORDERS

An Unique Application of Remote Control

A NEW kind of electric tugboat has recently been put in service on the St. Lawrence River. It tows carfloats between the New York Central terminal at Ogdensburg, New York, and the Canadian Pacific Railroad terminal at Prescott, Ontario. When the float is ready to leave, the tug noses up, the two boats are tied together, an electric connection is made, and the pilot leaves the tugboat and boards the carfloat. The trip is then made with the pilot on the bridge of the towed boat, all the operations of the machinery on the tug such as steering and engine maneuvering being controlled from that point.

This remote control was essential to the proper operation of the towing system. The tugboat is small compared to the car float and, were the pilot to remain on the tug, he could not see well enough in all directions to control the movements of the two boats. A special remote control scheme was therefore designed and built by the General Electric Company who also built the propulsion equipment on the tug.

The tugboat is owned by the Canadian Pacific Car and Passenger Transfer Company and was built by the Canada Steamship Lines at Levis, Quebec. It is of steel construction, 120 feet long, and is propelled by diesel-electric drive. It is not only the first example of this special type of control for a tugboat, but is also the first electric tugboat on the St. Lawrence River. The carfloat, built by The American Ship Building Company in Cleveland, is also of steel and has three tracks with a capacity of 23 cars.

Electricity for propelling the tugboat is supplied by two electric generators rated 330 kilowatts, 250 volts, 245 revolutions per minute, and driven by two Winton diesel engines. Power for auxiliary purposes is supplied by two generators also driven by the diesel engines and rated 50 kilowatts, 120 volts, 245 revolutions per minute. The propeller is driven by a direct-connected motor rated 800 horsepower, 105 135 revolutions per minute, and of double unit construction.

Control of the propulsion machinery is of the variable voltage (Ward Leonard) type. Three operating stations are provided, one in the engine room, one in the pilot house, and a third on the bridge of the car float.

Diesel-electric tug Prescotont which is arranged for remote control from the bridge or from the tow.

Incorporating Art in Mechanical Design

RECENTLY appointed Director of Art for the Westinghouse Electric and Manufacturing Company, Donald R. Dohner, formerly instructor in design at Carnegie Institute of Technology, assists in carrying out the new plan of the Westinghouse Company for incorporating principles making for fine appearance as well as mechanical perfection in the design of electrical machinery. In his capacity of Director of Art, Mr. Dohner will cooperate with the engineering department in designing electrical apparatus according to artistic principles.

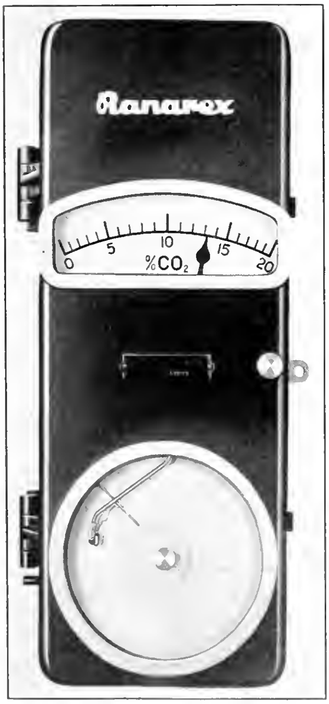
Under Mr. Dohner's direction, a course for Westinghouse designers and engineers has been planned to assist their understanding and becoming conscious of the elements and principles of design as applied to improving the appearance of industrial products. This course has been instituted because, due to the diversified and wide-spread activities of the company, it is impossible to employ an artist-designer, stylist, or consultant to assist in the design of all equipment; and it is expected to spread throughout the engineering departments a conception of art in its relation to industry.

New Carbon Dioxide Indicator and Recorder

THE Permutit Company has placed on the market a new model of its Ranarex CO_2 indicator and recorder. The well established Ranarex principle, based on specific gravity, has been retained, but the design has been simplified and the machine made more compact and rugged.

All working parts are easily accessible. The entire indicating and recording mechanism is attached to one plate, and the driving mechanism, including the motor, to another. Both plates may be removed without the use of tools by loosening a few wing screws; their removal opens all gas passages over their entire length. Connection between the humidifier compartments and the measuring chambers is established by channels of ample cross section.

In most instances the time lag will be less than a minute. This is of great importance to the power plant engineer and his assistants, as it enables them to correct firing conditions just as soon as a change is needed. Hence the proper percentage of CO_2 can be maintained at all times.



New type of carbon dioxide indicator and recorder.

Corrosion resistant materials such as bakelite and special alloy steels are used extensively for parts in contact with flue gas. The machine is enclosed in a dust-proof cast aluminum casing and is not affected by heat, moisture or shock. It is available for wall or panel mounting.

The standard 9-inch scale and circular chart 8 inches in diameter are graduated from 0 to 20 per cent. CO_2, and accuracy within 0.3 per cent. CO_2 is guaranteed. The recording mechanism is driven interchangeably by a spring clock or an electric clock, as desired.

The Permutit Company is prepared to furnish Ranarex machines with any desired scale range for special applications where the specific gravity of a gas mixture is a guide to efficient and satisfactory operation.

New Alloy Cast Iron

DEVELOPMENT of an alloyed cast iron which makes for simpler design of internal combustion engines has been reported to the American Society for Steel Treating at its twelfth annual convention in Chicago, September 22-26, by J. S. Vanick and P. D. Merica of the International Nickel Company in a paper which described a nickel-copper-chromium alloy of cast iron, the expansion coefficient of which is said to approximate that of the aluminum alloys used in the construction of cylinder heads and pistons. Thus, this alloyed cast iron —known as Ni-Resist—permits the construction of cylinder blocks which will expand under heat conditions at a rate more closely in accord with the expansion of the pistons than ordinary cast iron will. This iron is essentially a corrosion and heat resisting material.

"Field service tests under a variety of conditions," according to the paper, "have confirmed in general the results of laboratory tests in establishing a greatly increased service life for this material as compared with plain iron, and a life comparable in many cases with bronze. It has been further demonstrated that this material, except for being considerably more corrosion and heat resistant than plain iron, is in general quite similar to it in characteristics and fabricability. Thus, it can be produced in the ordinary cupola, and can be molded, cast, and handled in foundry and machine shop under conditions similar to those in practice for gray iron."

All-American Motor Tankers

OUR illustration shows the motor tanker Tide Water Assoiated at the outfitting pier of the Sun Shipbuilding & Drydock Company, Chester, Pennsylvania. This tanker and a sister, the Tide Water, are being completed this year for the Tidewater Associated Transport Corporation and are part of a large group of sister tankers building at the Sun yard for several American operating companies.

These vessels have a length between perpendiculars of 480 feet, beam of 65 feet 9 inches, and a depth of 37 feet. The displacement is 19,308 tons on a draft of 27 feet 8-7/16 inches, giving a deadweight carrying capacity for 13,738 tons and a fuel capacity of 7700 barrels.

A Sun-Doxford opposed piston oil engine of 2800 brake horsepower, direct-connected to a single-screw propeller, drives the tanker at 11 knots service speed with a fuel consumption of 12.3 tons per day. This engine is of the single-acting, 2-cycle, solid injection type, with four cylinders and attached scavage pump driven from the engine shaft. The cylinder bore is 23-5/8 inches and the combined stroke is 91.3 inches. Normal power is generated at 80 revolutions a minute, which is an ideal speed for efficiency of propulsion from the propeller design standpoint. Piston speed works out at 608.9 feet per minute, which is low enough to insure easy wear on cylinders. The indicated horsepower is 3256, showing a mechanical efficiency for the engine of 86 per cent. The engine dimensions are: Length over-all to after face of thrust block, 56 feet 2 inches; width over-all, 13 feet 5 inches; height over-all, 32 feet 1 inch. The weight of the engine as installed is 780,000 pounds, or 278 pounds per brake horsepower. The total weight of machinery on each tanker is 1,456,000 pounds.

For cargo tank discharge, three steam oil pumps are installed. Two

The newly completed motor tanker Tidewater Associated, equipped with Sun-Doxford opposed piston engines, tied up to the dock at the Sun Shipbuilding & Drydock Company where she was built.

are 20 by 16 by 24-inch horizontal duplex National Transit Company, separate chest piston steam pumps of the group valve type for main cargo. One is a 12 by 8 by 12-inch vertical Duplex National Transit Company, piston steam pump for cargo stripping. To supply steam for operating these pumps and for heating coils, one Foster-Wheeler water-tube boiler is used. This has a heating surface of 4000 square feet and works at 200 pounds pressure, and is fitted with Todd oil burners and Diamond soot blowers.

Electric Air Oscillator for Three New Lightvessels

IN response to the demand for more powerful electric fog signals to increase the safety of navigation, the United States Lighthouse Service has installed upon the three new lightvessels, which are to go into commission shortly, a powerful type of electric air oscillator. These three new lightships will replace three older ships which have given many years of excellent service at Nantucket Shoals, Fenwick Island Shoals, and Frying Pan Shoals.

This electric air oscillator is similar to those which have been in operation at a number of shore stations and lighthouses in the Second, Third, Fifth & Twelfth Lighthouse Districts. A smaller and less powerful type of electric air fog signal, known as the Nautophone, has been in operation at several stations in the Second, Third, Fifth & Eighteenth Districts. Installations which are in operation as well as those which are being made in Canada are as follows:

Electric Air Oscillators

Second Lighthouse District: Cape Cod at North Truro; Cape Cod Canal, Eastern Entrance Range, Cape Cod Bay on outer end of Breakwater; and Chelsea, Nantucket Shoals Lightship.

Third Lighthouse District: Orient Point, Gardiners Bay, New York; and Watch Hill, Entrance to Fishers Island Sound.

Fifth Lighthouse District: Baltimore, Fenwick Island Shoal Lightships; and Cape Henry, Virginia.

Sixth Lighthouse District: Charleston, Frying Pan Shoals Lightship.

Twelfth Lighthouse District at M[illegible]kegon, Michigan.

Canadian Lighthouse Department. Port Weller Light Station at Port Weller, Ontario.

Nautophones

Second Lighthouse District: Nantucket East Breakwater (on outer end entrance to Nantucket Harbor on conical pile of rip rap).

Third Lighthouse District: Old Orchard Shoal, Gedney Channel, New York Lower Bay approach; West Bank, New York Lower Bay approach; and Robbins Reef, New York Upper Bay.

Fifth Lighthouse District: Cove Point, Chesapeake Bay.

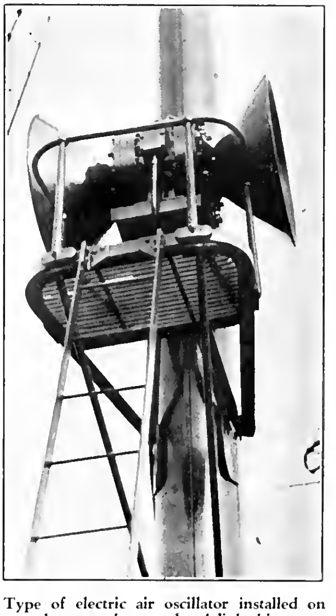
Eighteenth Lighthouse District: Long Beach Harbor Light Station, California.

Canadian Lighthouse Dept.

Kincardine Fog Alarm Station, Perry Sound, Ontario.

The installation of these electric air oscillators upon lightships and at shore stations marks another advance in the use of electricity for navigating purposes. The use of double horns pointed in opposite directions allows for a more uniform distribution of sound throughout the horizon than can be obtained with a fog horn having but a single throat. The pitch of the sound signals emitted by this latest type of fog signal is musical. Maximum intensity and uniform pitch of signals are maintained throughout the duration of the blasts and for the desired length of time adopted for the code used. A marked reduction in the cost of operation is a noteworthy characteristic of the electric air oscillator.

This type of electric fog signal is manufactured by the Submarine Signal Company of Boston. The increasing use of this type of "first-class" fog signal, both in this country and abroad, indicates the progress being made by lighthouse authorities in adopting the latest and most efficient equipment for increasing the safety of navigating ships when approaching land.

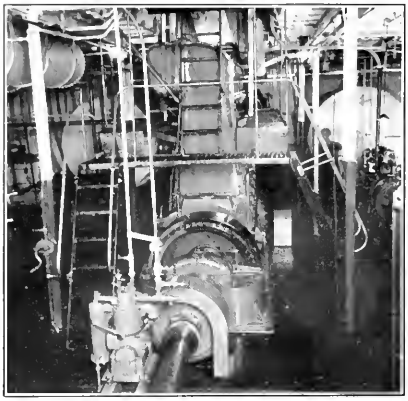


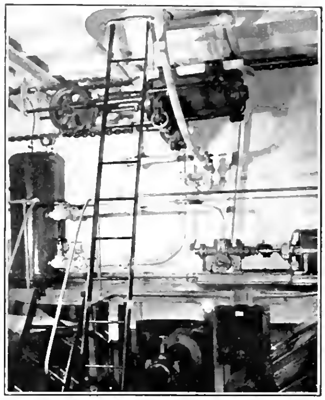
Type of electric air oscillator installed on the recently completed lightships.

An Interesting Motor Lighter

THE New York Central No. 35, a diesel-powered, covered lighter, the speediest and most efficient of its type on New York Harbor, was recently turned over to the New York Central Railroad by its builders, United Dry Docks, Inc.

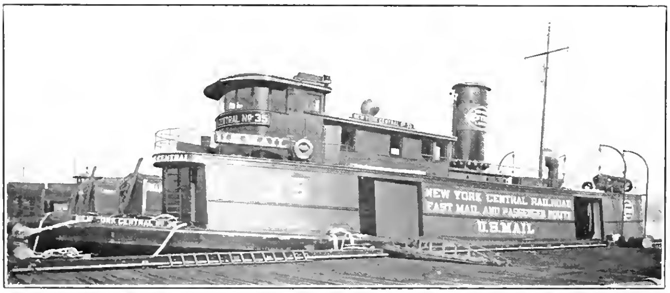
The lighter is powered with an Ingersoll-Rand, 600-horsepower, marine diesel engine, designed to operate at 240 revolutions per minute. On its trials the Number 35 attained better than 13 miles per hour at 204 revolutions.





(Left) Engine room of the diesel lighter New York Central No. 35 equipped with the 600-horsepower, Ingersoll-Rand diesel engine which is used for propulsion. (Right) Unidock electro-hydraulic steering gear on the new diesel lighter.

Built of steel, with the superstructure of wood reinforced by steel, this lighter is 122 feet long, 32.6 feet beam, and 14 feet deep. Cargo is carried on the main deck under a deckhouse that extends almost the full length of the ship and provides space for about 80 tons of general cargo.



Covered-cargo diesel lighter at her dock in New York harbor.

A unique feature of the lighter is its steering gear, which has been named the Unidock ram steering engine. It is an adaptation of the steam ram type which was designed several years ago by United's Staten Island Plant and now is in general use on New York harbor craft.

The new engine is of the electric hydraulic type and consists of a cylinder and piston operated by hydraulic pressure. The pressure is applied through the medium of oil admitted to either side of the piston by a piston valve operated by drum and wire rope from the pilot house and equipped with a follow-up gear attached to the crosshead. The oil is kept at practically constant pressure by an electrically driven pump running at constant speed, and which delivers through a pressure tank to the valve chest on the engine, with a relief valve in the line through which the surplus oil is delivered to the supply tank. The pressure tank is kept about one half full of air at working pressure, to form an air cushion and reduce fluctuations in pressure when the engine is in operation. Oil discharged from the engine is led to a supply tank with a capacity sufficient to hold all the oil in the system. The pump takes its suction from this tank.

At the Staten Island Plant of the United Dry Docks, Inc., there is under construction a ferryboat of the largest type used in New York harbor, to be used in the New York municipal ferry service to Staten Island. This boat will be 267 feet long, 66 feet wide over guards, 9 feet 9 inches deep, and will have two decks with a total seating capacity of 1650 and a gangway capac-

Cargo space available on the new diesel lighter is 30 per cent. greater than on the steam-driven lighters.

ity for 32 automobiles. She will have a 4000-horsepower steam engine, will make 18 miles an hour, and will cost $941,000.

This same plant has on order a Coast Guard cutter of the Chelan type to cost $865,000. These two jobs will give employment to several hundred men during this year.

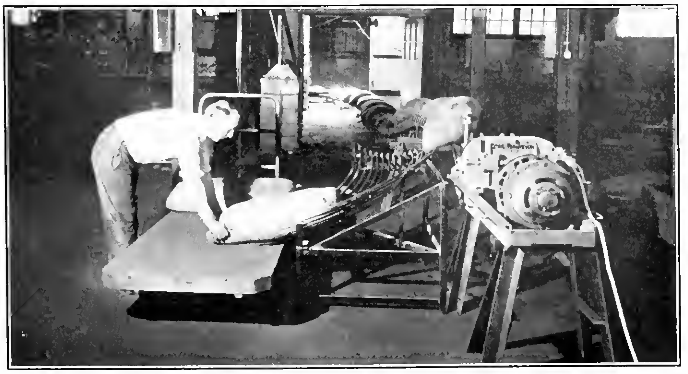
Economical Cargo Handling

TRAFFIC and transportation men will be interested in a new car or barge loading and unloading equipment which is said to make remarkable reductions in the cost of loading freight cars with almost any type of packaged freight and comparable cost reductions in the unloading process.

This equipment consists of eight short sections added to the end of a standard Clark TwinVeyor. The TwinVeyor itself consists of a series of dual sections of spiral tubes turned toward each other by a power head. It is used extensively in conveying, elevating, and tiering commodities in bags, bales bundles, crates, and cartons.

The operation of the loading assembly is as follows: The standard TwinVeyor extends to the car door. The addition of four short dual sections extends the line into the car, makes the right angle turn to the right, and, in operation, delivers the freight to the far end of the car, waist high. As the end of the car is filled, the end section of the TwinVeyor is removed. The line is successively shortened until one end of the car is completely loaded. Attachment of the four other sections of the car loading kit extends the line to the left hand end of the car and is similarly shortened as loading proceeds. With both ends loaded, the center section is loaded from the end of the TwinVeyor.

Transposing the right and left hand tubes in the assembly reverses the flow of material, making the unloading operation as easy as loading. The dual tube sections are easily handled. Attachment or removal of a section takes one minute. The speed of operation depends to some degree upon the size, weight, and shape of packages. The bagged material shown in the illustration is loaded or unloaded at the rate of 30 bags per minute. The TwinVeyor line will convey these bags 90 feet per minute up a 15 per cent. grade.



Clark TwinVeyor unloading bags. This equipment will move these bags at a rate of 90 feet per minute up a 15-degree slope.

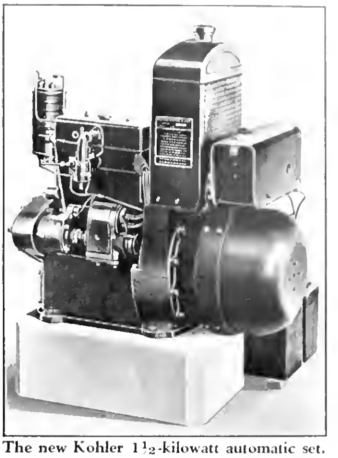
Towboats De Luxe

THE towboats being placed in service by the Mississippi Valley Barge Line Company in its newly established service between New Orleans and Cincinnati are as completely and modernly equipped as many seagoing vessels. Four of these boats have been built, two by the Dravo Contracting Company of Pittsburgh and two by the Chas. Ward Engineering Works of Charleston, West Virginia.

These boats are 200 feet long and 40 feet wide, with a lower and two super decks and a pilot house on the fourth deck. On the third deck are staterooms for the captain, owner, chief engineer, and radio operator.

As indicative of the quality built into these towboats, Plymetl, the metal-faced structural plywood was used for ceilings and doors, and Haskelite was used for ceilings and partitions in the crew's quarters.

New Automatic Light and Power Unit



The new Kohler $1\frac{1}{2}$-kilowatt automatic set.

ELECTRICAL service making it possible to burn for long periods a few lights on yachts or other craft without starting the electric plant is offered by the new Kohler D-32, $1\frac{1}{2}$-kilowatt, 32-volt, direct current unit which will be shown January 16 to 24, at the New York Motor Boat Show.

Designed to meet special needs on yachts and other boats, as well as on railroads and in camps, resorts and farm homes, the D-32 furnishes small amounts of current most economically and noiselessly, from a small 2-tray rubber cell 32-volt battery. A few lights can remain burning throughout the night and still the plant remains silent. However, when current is needed for motors or heaters, or when the demand otherwise has reached 300 watts, the plant is started automatically, the load is shifted from the battery to the plant and power goes directly from the generator to the line. Likewise, when the load is reduced to aproximately 200 watts, the engine stops and current for the lights is again taken from the battery. The entire operation is automatic. Lights, appliances, motors, heaters, and other current consuming devices are turned on as needed and electricity up to a capacity of $1\frac{1}{2}$-kilowatts is there. The battery is charged automatically.

In addition, a model EP-36 (marine type) $1\frac{1}{2}$-kilowatt plant, used as an auxiliary unit for battery charging on yachts and other craft, and a model D $1\frac{1}{2}$-kilowatt unit will be shown in the Kohler exhibit.

American Shipbuilding

Edited by H. C. McKinnon

Federal Yard to Build Panama-Mail Liners. The Federal Shipbuilding & Drydock Company, Chester, Penn., has been awarded contract by W. R. Grace & Co., New York, for four twin-screw combination mail, passenger, and cargo steamers for the Panama Mail Steamship Company, 2 Pine Street, San Francisco, for operation between California ports and Puerto Colombia, Colombia, via Central American ports and the Panama Canal. This yard was low bidder for the work. The price is $3,850,000 for each vessel; hotel equipment, furnishings, and decoration will bring the total cost to over $4,250,000 each. Time of delivery is 20 month, 22 months, 24 months, and 27 months, respectively. The vessels are being built under the terms of the Merchant Marine Act, 1928, and Ocean Mail Contract covering route No. 37.

The vessels were designed by Gibbs & Cox, Inc., naval architects, 1 Broadway, New York. The general characteristics are:

Length	508 ft.
Beam	72 ft.
Depth	39 ft.
Displacement, tons	16,800
Deadweight tonnage	7,500
Horsepower	14,000
Speed, knots	19
Fuel consumption per day, tons	90
Passengers:	
First class	222
Third class	64
Refrigerated cargo capacity, tons	1000

The vessels are to be equipped throughout with the latest type General Electric Company machinery, including steam turbines and double reduction gears. The equipment of these vessels will mark a distinct forward step in marine propulsion, following all the recent improvements in land power installations. The power plants, generating steam at 400 pounds per square inch pressure and at total temperature of 750 degrees Fahrenheit, will have the highest pressure and temperature of any American passenger steamer.

The vessels will be built in accordance with all the latest requirements for safety of passengers and their equipment will exceed the requirements of the International Convention for Safety of Life at Sea, being what is known as two-compartment ships, plus. In addition, they will have special watertight subdivisions between the boiler rooms and the machinery spaces.

The passenger accommodations will be taken care of by public rooms on the promenade deck, with full size double-decked dining saloon to be finished in California Spanish type of architecture. The location of the dining saloon on the promenade deck is an innovation in American ship design. Aft on the promenade deck will be located an open air night club with large dance floor. Other rooms include lounge and smoking room forward, library and children's dining room and play room, talking picture equipment. The promenade overlooks the open air sports deck, which is equipped with a permanent tiled swimming pool and gymnasium.

Every passenger room is a full outside room, equipped throughout with beds; and each room has a private bath and toilet. There are six suits de luxe, with trunk room and special accommodations for maids and chauffeurs. The vessels will be equipped throughout with especially designed ventilating and cooling system for comfort of passengers in tropical waters.

These vessels represent a great stride forward in design and accommodation for vessels trading between Pacific Coast ports and ports of Central and South America and should be instrumental in causing of great increase in travel and commerce between North and South America. The ports of call are as follows: San Francisco, Los Angeles Harbor, Mazatlan (Mexico), Champerico and San Jose (Guatemala), Acajutla and La Libertad (Salvador), Corinto (Nicaragua), Punto Arenas (Costa Rica), Balboa and Cristobal (Panama Canal), Cartagena and Puerto Colombia (Colombia), Havana (Cuba), and New York. The transit time is 20 days eastbound and 19 days westbound.

Asks for New Lightship. The Municipalities of Vancouver and New Westminster, British Columbia, have filed a request with the Federal government at Ottawa for the construction of a modern lightship to be equipped with diaphone and radio beacon, to be stationed at the end of the jetty.

Bids Opened for Lighthouse Tender. Bids were opened December 17 at the San Francisco Office of the Bureau of Lighthouses for the construction of a twin-screw tender for use on San Francisco Bay and tributary territory.

Hull bids were submitted as follows:

Moore Dry Dock Co., $139,949 and 210 days;

General Engineering & Drydock Co., $141,455 and 285 days;

Bethlehem Shipbuilding Corp., $149,780 and 240 days;

Los Angeles Shipbuilding & Drydock Corp., $155,000 and 300 days;

Lake Washington Shipyards, $156,000.

Bids for supplying the diesel power plant were:

Atlas-Imperial Diesel Engine Co., $40,288 and 120 days;

Winton Engine Corp., $42,250 and 165 days;

Superior Engine Co., $47,745 and 160 days;

King-Knight Co., $49,335 and 100 days.

The vessel will have a length overall of 121 ft. 4 in.; length at water line of 111 ft. 8 in.; beam molded 25 ft.; minimum depth 9 ft.; and draft of 6 ft. 8 in. She will be of 323 tons displacement.

The power plant will consist of two 240-horsepower, 350 revolutions per minute diesel engines to give a speed of $9\frac{1}{2}$ knots. Accommodations will be provided for a crew of 16, including officers, and the vessel will be equipped with the most modern electrical appliances.

New Type Log Barge Developed by W. C. Nickum

From the office of W. C. Nickum, Seattle naval architect, comes the announcement of a revolutionary type of steel log barge designed to replace ocean going rafts of the types developed along the coast for hauling logs from Nehalem and Tillamook bays and the Columbia River to Grays Harbor and as far south as San Diego.

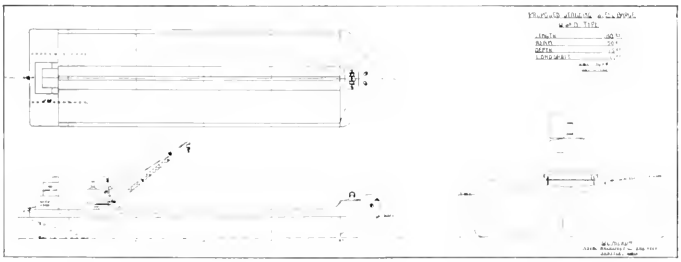
Contract for the construction was awarded to the Marine Construction Company of Seattle on a low bid of about $85,000.

The design is patented by Mr. Nickum and calls for a steel barge to be constructed on the Isherwood combination system, with over-all dimensions of 180 ft. length, 50 ft. beam, and 15 ft. depth, with a loaded draft of 11 ft. The barge will have a capacity of from 500,000 to 600,000 ft. of logs, depending on sizes carried. The barge will have five transverse water-tight bulkheads and a centerline water ballast tank. The deck will be sheathed with 5-inch fir.

Double stockless anchors will be carried forward, handled by a steam winch. The entire space between the space for windlass on the bow and the small deckhouse aft will be given over to log storage, accommodating logs up to 140 ft. in length, all carried as a deck load and bound with the usual chain and cable gear. A 25-ton Ohio Locomotive Co. steam crane will travel along the center of the barge on rails, for loading and be arranged so it can be tied down on the aft end of the track, which runs above the deck. Flexible couplings between the donkey boiler of the crane will supply steam to two centrifugal ballast pumps and the windlass for the anchor, and one aft for handling the chain drag gear used to steady the barge over the bars. One hundred fathoms of chain will be carried in the lower part of the aft deckhouse for this purpose. Two large rudders, operated by hand screw gear, will be used for maneuvering in close quarters. Accommodations for the crew of six men are located on the upper part of the aft deckhouse.

The chief saving of handling ocean going log movements in this type of a barge is shown to be in the fact that an ordinary 500-600 horsepower diesel tug will tow more than twice the number of logs at twice the speed of an average seagoing raft. Speed is given at from 5 to 7 knots, fully loaded, with the average size tug operating from Grays Harbor to Nehalem bay. Approximately 8 hours will be required to load and four to unload the barge.

The Allman Hubble Tug Co. of Aberdeen has been given the contract to tow this barge, and Grays Harbor lumber mill has contracted to use it, with the provision that a duplicate barge of this type will be constructed three months after the first one is completed. A syndicate of Grays Harbor shipping and lumber firms has been formed to build this and other barges of this type, headed by Albert Schubach.



Steel log barge for ocean service designed by W. C. Nickum of Seattle.

Bids Called on Pilot Boat. Tenders will be opened January 7 at the office of the General Manager of the Los Angeles Harbor Department, 405 Branch City Hall, San Pedro, Calif., for construction of a diesel-powered pilot boat. The boat is to be 58 ft. 6 in. length over-all, 15 ft. beam, 7 ft. 6 in. draft, and powered with a 300-horsepower diesel engine to give a speed of 15 knots.

Bids Opened on Lighthouse Tenders for East Coast. Tenders were received at the office of the United States Lighthouse Service, Washington, D. C. on December 10 and 16 for the construction of two lighthouse tenders. One of these is to be of the Violet class, 170 ft. overall, 32 ft. molded beam, 8 ft. 6 in. draft; powered by two vertical, triple expansion, surface-condensing engines.

Hampton Roads Shipbuilding Corp., was low bidder for the Violet-class tender, submitting prices of $344,975 and $343,975, respectively. Other bids ranged from $360,000 to $471,968.

Low bid for the construction of the tender Cherry was submitted by Leathem D. Smith Dock Co., $84,900, and $82,500 for an additional boat.

Low bid for the diesel engine installation was submitted by the Atlas-Imperial Diesel Engine Co. of Oakland, Calif., at $16,247 for one boat. Cummins Engine Company submitted low bid of $4957 for one boat for the auxiliary machinery.

New Boatyard Planned. The Victoria Motor Boat and Repair Works has filed plans with the Dominion Minister of Public Works and the Victoria Land Registery office at Victoria, British Columbia, for a proposed marine railway to be built in Victoria Harbor.

Largest Repair Job Awarded. Bethlehem Shipbuilding Corp., Union Plant, San Francisco, has been awarded one of the largest repair jobs ever let on the coast. This is repairs to the Richfield Oil Company's tanker Tamiahua which grounded near Pescadero on the California Coast November 6 and was floated by Merritt-Chapman & Scott Corp. on November 25.

The contract calls for renewing of 210 bottom plates, overhauling the machinery, boilers, and pipe lines, and other incidental repairs. A crew of 300 additional men has been put to work at the Potrero Plant and Hunter's Point dry-dock; and the estimated cost of the work is $550,000 and 115 calendar days.

The work of floating this tanker was ably performed by the salvage company and is described on another page of this issue. The tanker, which is 500 ft. long, 71.2 ft. beam, and 31.2 ft. depth, is said to have been insured for about $1,600,000.

Refrigerated Bait Boat Building.—Harbor Boat Building Company, Terminal Island, San Pedro, California, recently started construction of a 125-foot refrigerated bait boat for John Zuanich and Tony Zankich, who fish for the Southern California Fish Corporation. The craft is to be powered with a 500-horse-power Western - Enterprise diesel engine, with two 80-horsepower auxiliary engines. Two 15-ton refrigerating units will be installed. The vessel is scheduled for completion in April and will cost about $100,000.

St. Helens Shipbuilding Company, Portland, Oregon, was awarded contract for overhauling and repairing the lighthouse tender Heather on a bid of $35,500.

Bids Called from Private Yards for Naval Cruiser. — Secretary of the Navy Charles Francis Adams on December 22 issued specifications for the construction of Light Cruiser No. 37 to private American shipyards, and bids will be opened at the office of the Navy Department, Washington, D.C., on February 11, 1931.

Light Cruiser 37 will be a sister ship of the New Orleans class. The New Orleans is now under construction at the New York Navy Yard. Funds for the construction are provided in the budget for the fiscal year 1932 presented to Congress. The limit of cost allowed for these cruisers is $17,000,000. Plans and specifications were prepared at the New York Navy Yard.

Steel Barge Ordered. Bethlehem Shipbuilding Corp., Union Plant, San Francisco, has an order from the Inter-Island Steam Navigation Co., Honolulu, for an all-steel barge of 1000 tons capacity, to cost about $65,000.

Yard Busy on Seiners. Barbee Drydock and Shipbuilding Co., Seattle is completing two purse seiners with over-all dimensions 56 by 15.4 by 11 ft., to be powered with diesel engines, reported to be of a new type designed by A. C. Estep, formerly with the Washington Iron Works, and designer of their Washington diesel, formerly known as the Washington-Estep diesel. One of the purse seiners is being built for Dome Moskovita of Bellingham and Richard D. Suryan of Anacortes.

This yard will also begin work in January on a 76 by 18 by 12 ft. cannery tender for Davis Bros. of Alaska, also to be diesel powered.

Tacoma Yard Completes Freighter—Starts Yacht. Mojean and Ericson, Tacoma shipbuilders, have finished the second small Sound-type freighter for Tacoma interests, this one being a 65 by 25 ft. flat bottom freight and passenger ship of 200 tons capacity for John Manson, operator of the line between Tacoma and Vashon Island. A compound steam engine and a water-tube boiler give this boat 10 knots speed; and she will be used for the winter service of the company.

This yard also secured the contract to build a pleasure schooner 50 by 13 ft. for Fred E. Clark of Seattle. The ship will be built of Alaska cedar and oak, with two tall fir spars. A 100-horsepower Hall-Scott gas engine with reduction gear will be her auxiliary power. She will have a speed of 10 knots. Two cabins and a modern galley with oil burning range will provide living accommodations.

New Purse Seiner. J. M. Martinac Shipbuilding Co. of Tacoma completed hull 42 in December, a 74 by 18 by 8.9 ft., diesel-driven purse seiner for Joe Alioto of Monterey, California. A 135-horsepower Washington diesel gives the ship 10 knots speed.

Fishing Vessels Building. Campbell Machine Co., San Diego, is building a 117-foot tuna fishing vessel for Mariano Crivello of San Diego. The craft will have a beam of 22 feet and depth of 11 feet and will cost about $95,000.

Another San Diego firm, the San Diego Marine Construction Co., has an order from Jose Januari for a 100-foot clipper bow tuna fishing vessel which will cost about $75,000.

Al Larson, boat builder of San Pedro, is building a 120-foot fishing vessel for Captain Manuel Medina, prominent fisherman of San Diego. This yard has been very busy for the past few months on jobs for various fishing interests. A 125-foot cruiser for the Southern California Fish Corp., to cost $100,000 is under construction; also an 85-foot purse-seiner for John Bracich and Nick Vojocich.

Orders in Prospect for Boatyards. It is reported from Southern California fishing centers that several orders for modern, high speed fishing craft will be let shortly, among the orders under consideration are one to be placed by W. E. Ash for a 90-foot vessel; one by Mr. Ozawa for a 120-foot, 480-horsepower fishing craft, which is reported to be scheduled for the San Diego Marine Construction Co.

All-Steel Tugboat. The Manitowoc Shipbuilding Corp., Manitowoc, Wis., has an order for a 115-foot steel tug to be powered with steam turbines connected to the propeller through reduction gears and developing 850 horsepower. Babcock & Wilcox boiler is to be installed. The tug will have a beam of 26 feet and depth of 15 feet.

Federal Quarantine Tug. General Engineering & Dry Dock Co., Oak-

Steel oil barge recently completed by Lake Washington Shipyard for the Foss Tug and Barge Company of Seattle and Tacoma. This barge will be used around Puget Sound, transferring oil to the smaller ports, and is the first of its type to operate on the Sound. It has a capacity of 7500 barrels and is equipped with Northern pumps.

land, Calif., was awarded contract by the United States Public Health Service, Quarantine Division, San Francisco, for the construction of a boarding tug for San Francisco Bay service. The craft is to be 60 ft. 10 in. over-all length, 15 ft. beam, 7 ft. 2 in. depth; and will be powered by a 120-horsepower Fairbanks-Morse diesel engine.

Snagboat for Canadian Service. The Prince Rupert Drydock & Shipyard, Prince Rupert, B. C., has an order from the Dept. of Public Works of Canada for a wooden, stern-wheel river snagboat which will take the engine from the snagboat Bobolink. The new hull will be 100 ft. length, 29 ft. beam.

Two Orders Entered. Charleston Drydock & Machinery Co., Charleston, South Carolina, has recently entered an order for an all-welded steel ferryboat for the Seaboard Air Line, Seaboard Bldg., Norfolk, Va., this yard is also building an all-welded steel yacht, owner not named.

The ferryboat is for operation on the Savannah River in place of the Summer Girl. It will be 64 ft. 6 in. long, 22 ft. width, 8 ft. depth and will be powered with a diesel engine connected to a single screw.

Wharf Barge Building. The Howard Shipyards & Dock Company, Jeffersonville, Ind., has an order from the City of Peoria, Illinois, for a terminal wharf barge to be 230 feet long, 45 ft. beam, and 8 ft. deep, with a steel deckhouse 205 ft. long. Cost $63,733.

Lake Washington Shipyards, Houghton, Wash., recently completed the rebuildiing of the ferryboat Quilcene (ex-City of Bellingham) at a cost of about $35,000 for the Puget Sound Navigation Company for operation between Seattle and Port Townsend. Her cabin has been rebuilt and refurnished and her engines rebuilt to give her a speed of 14 knots. Accommodations for 45 automobiles have been arranged. In fact, the vessel's appearance has been totally changed and she is practically like a new ship.

This yard is now engaged in certain changes and betterments to the ferryboat Leschi, which include the installation of new propeller shaft, 800-horsepower Washington diesel engine, and deepening of the hull to accommodate the diesel engine.

Will Sell Ships for Scrapping. The offer of the Union Shipbuilding Company of Baltimore received in December for the purchase of 45 steel cargo steamers of the Board's laid up fleet to be scrapped was accepted by the Shipping Board. The offer, which was the highest received in response to the Board's advertisement for bids, amounted to $384,960. The 45 vessels aggregate 357,560 deadweight tons. All the vessels must be completely dismantled and scrapped within a period of two years.

Diesel-Electric Oil Barge. Sun Shipbuilding Company, Chester, Penn., has an order from the Atlantic Refining Co., 260 South Broad Street, Philadelphia, for a diesel-electric, self-propelled barge to be 190 ft. between perpendiculars, 34 ft. beam, 12 ft. depth. The power plant will consist of three 150-horsepower Cooper-Bessemer diesel engines connected to electric generators, supplying power to a 400-horsepower main propulsion motor. The hull will be welded and will have capacity of 7000 gallons of oil.

Contract for Ferryboat. The United Dry Docks, Inc., Staten Island Plant, Staten Island, N. Y., has received contract from the Department of Plant and Structure City of New York, on a low bid of $941,000, for a ferryboat which is to be similar to the Dongan Hills. The craft will be 267 ft. over-all, 66 ft. beam, 12 ft. 9 in. loaded draft. She will be powered with double compound engines developing 4000 indicated horsepower and giving her a speed of 12 knots. Four water-tube boilers will supply steam. Keel will be laid about the middle of January. Seating capacity for 1650 persons is to be provided and the main deck will carry 32 vehicles.

Bids Called on Combination Steamship. Bids will be opened at the office of Naval Architect Theodore E. Ferris, 30 Church Street, New York, on January 5 for the construction of a twin-screw, combination passenger and freight steamer for the Red D Line (Atlantic & Caribbean Steam Navigation Co.) 140 Wall Street, New York.

The vessel is to be 348 ft. 10 in. over-all, 336 ft. between perpendiculars, 51 ft. beam, 18 ft. draft. She is to be powered with single reduction geared turbines developing 3500 horsepower. Steam is to be supplied by oil-fired, water-tube boilers at 275 pounds per square inch pressure and 100 degrees Fahrenheit superheat. The vessel will have accommodations for 113 in first-class and 24 in second class and will have a speed of about 13 knots. She is to be similar to the steamship Caracas.

Two New Ferryboats for New York. Todd Dry Dock, Engineering & Repair Corp., Brooklyn, N. Y., was low bidder December 8 for constructing two double-end ferryboats for the Department of Plant and Structure of the City of New York. The vessels are to be 151 ft. long, 53 ft. over guards, 36 ft. 7 in. molded beam, 14 ft. 3 in. molded depth, with two vertical compound steam engines developing 850 horsepower. Three yards bid for this work as follows: Todd, $774,620; John W. Sullivan Co., $804,700; United Dry Docks, Inc., $816,000.

Freight Vessels Planned. According to reports from the East Coast, Thomas D. Bowes, naval architect with offices at Chestnut and Fifth Streets, Philadelphia, is completing plans and specifications for three bulk freighters to be powered by diesel engines. The freighters are to be 335 feet long, 54 feet beam, 20 feet depth and with propulsion plant of 1000 horsepower.

Bids Asked on Patrol Boats. The office of the United States Coast Guard, Treasury Department, Washington, D. C., will open bids January 5 for the construction of five, six, or seven offshore patrol boats. These craft are to be 165 feet long, 25 ft. 3 in. beam, and powered with twin diesel engines developing 1300 shaft horsepower.

U. S. Navy Yard, Mare Island, Calif., has received an appropriation to repair the destroyers Claxton and Jacob Jones which were damaged in collision off San Diego during recent maneuvers. The work will total $82,000.

The Navy Yard is building four target rafts at a total cost of $70,000.

Bethlehem Shipbuilding Corp., Union Plant, San Pedro Works, recently completed repairs to the Grace Line steamer Charcas costing about $100,000. The vessel grounded off point Firmin and was extensively damaged.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of December 1, 1930

Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd.
Union Plant, San Francisco

Hull 5347, steel barge for Young Bros., Ltd., Honolulu, Hawaii; 175x44x11 ft.; keel 2/20/31 est.

Hull 5348, same as above; keel 2/20/31 est.

Not named, hull 5349, steel tug for Young Bros., Ltd., Honolulu; 129'3" L.O.A.; 28 beam; 15 draft; Fairbanks-Morse 750 I.H.P. diesel engs.; keel 2/25/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

Saranac, No. 23, diesel - electric cutter for U.S. Coast Guard; 250x42x15 ft.; Westinghouse turbines and motors; 3000 S.H.P.; keel 11/16/29; launched 4/12/30; **delivered 9/20/30.**

Shoshone, hull No. 24, same as above; keel 3/15/30; launched 9/11/30.

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.

JOHNSON SHIPBUILDING CO.
329 Willow Street, Seattle, Wash.

Purchasing Agent: Geo. H. McAteer.

Job 63, one heavy framed pile puller, K.D., for Alaska Pacific Salmon Corp.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

C.N. No. 109, hull 36, steel car barge for Canadian National Railways; 279 L.B.P.; 42 beam; 12'3" depth; cap. 17 loaded freight cars; 3 tracks; 2 st. capstans, anchor windlass; keel 7/31/30; launch 12/9/30 est.; deliver 12/21/30 est.

Twelve wooden lifeboats for Canadian National Steamships, Ltd.; 28x8'6"x3'6"; deliver Dec.-Jan.

Not named, vee-bottom wooden pleasure cruiser for L. W. Kengin, Prince Rupert; 34 L.B.P.; 8 beam; 2'9" depth; 10 knots speed; 34-B.H.P. Redwing eng.; keel 11/1/30.

Bobolink, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink; **keel 12/8/30;** deliver 3/8/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Louisville, light cruiser CL-28 for United States Navy; 10,000 tons displacement; keel July 4/28; launched 9/1/30; deliver Mar. 13/31 est.

Astoria, light cruiser CL-34, same as above; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

Chicago, light cruiser CL-29 for United States Navy; 10,000 tons displacement; launched 4/10/30; deliver 3/13/31 est.

V-6, submarine SC-2 for U. S. Navy; launched 3/15/30; deliver 9/10/30 est.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., LTD., Union Plant

Drydock, paint, misc. repairs: Oregon, Silvermaple, Charcas, Nora, Brunswick, Cathwood, Saramacca, Tashmoo, John Bakke, Golden Cross, H. T. Harper, Virginia, President Grant, Caspar, Moctezuma, Pennsylvania, barge Piru, Redline, tug Sea Witch, ferryboat Coronado. Pipe repairs: Pacific Grove, Japanese Prince, Saxon Star, Harry Luckenbach. Repairs in chill room: Covena. 100 valves, guards, studs, etc.: Mojave. Lebec. Pump repairs: Warwick. Boiler repairs: Shabonee. Telemotor repairs: Antietam. Steering engine repairs: Irisbank. One tailshaft: Tashmoo. Repairs to damaged std L.P. turbine: Maui. Drydocked for survey: Tamiahau. One manganese bronze blade: Maunalei. Repair damages to deck house: Golden Dawn, Golden Coast. Misc. repairs: Caliche, Silvercedar, Pacific Trader, Spondilus, Lio, Mojave, Dio, Alamah, Tecumseh, John Bakke, Ario, City of Vancouver, Silver Maple, President Grant, San Mateo, Makua, Suriname, Makura, Moctezuma, La Perla, Irisbank, J B Stetson, Manukai, President Monroe, H. F. Alexander.

JOHNSON SHIPBUILDING CO.,
Seattle, Wash.

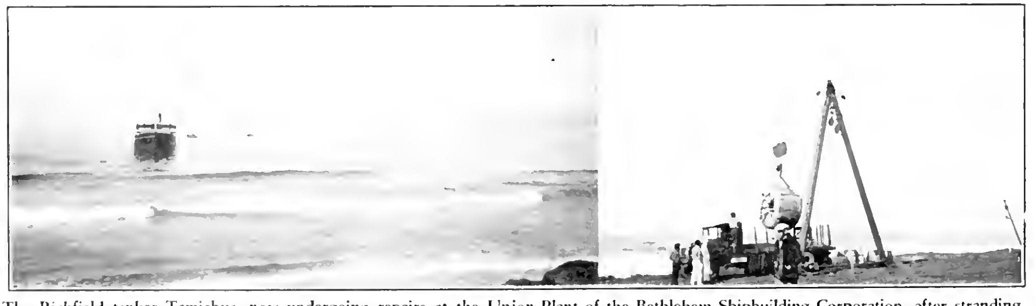
Caulked, new deck and rail plank: Reed Mill Scows Nos. 1, 2, 3 and 4. Misc. repairs on tugs, etc.

LAKE WASHINGTON SHIPYARDS,
Houghton, Wash.

Reconstruction of hull and house to accommodate new diesel engines on ferry Leschi. Power changed from steam, side-wheel propelled to diesel, stern-wheel propelled; 800 H.P. Washington Diesel engine installed in 180 ft. vessel, necessitating increasing of depth.

THE MOORE DRY DOCK CO.,
Oakland, Calif.

Drydock, paint, misc. repairs: schr. Mayfair, Santa Fe Barge No. 3, Northern Light. Drydock for survey: Eureka. Drydock, clean, paint: Alaskan (also misc. caulking and welding), American (also rewood rudder, gudgeons, misc. engine repairs), Western Pac. Barge No. 1 (also renew hull planking and fenders where necessary, caulk hull), Edwin Christenson (also repack stern gland, caulk misc. rivets in shell), Maunalei (remove and fair misc. damaged plates in way of No. 1 tank, caulk and weld misc. rivets, seams, etc.; remove propeller, drew tail shaft for examination, rewood inboard and outboard bearing, repack stern gland, overhaul sea valves, etc.) Saginaw (also caulk misc. seams, renew wood in rudder trunk, install misc. graving pieces, draw tailshaft for examination and remove and install new tailshaft), Tulsagas



The Richfield tanker Tamiahua, now undergoing repairs at the Union Plant of the Bethlehem Shipbuilding Corporation, after stranding near Pescadero Point. Due to the rough weather encountered it was necessary to rig a high line from the bow of the vessel to the shore a distance of 900 feet. The illustration shows the tanker in the surf with the lines and the shear legs on the shore end.

(also caulk and weld misc. rivets in shell, overhaul sea valves, repack stern gland). Pennsylvanian (install fairwater plates on rudder post, caulk and weld misc. seamsin rivets, remove propeller blade and renew studs, repack stern gland, wedge wear down of tail shaft), Willkeno (also caulk misc. rivets and seam), Frank M Coxe (also overhaul sea valves, repack stern gland, tighten up on propeller nuts), Golden Tide (also repack stern gland, test propeller nuts, test pintles, misc. caulking and welding of shell rivets and seam, drew tail shaft for examination, rewood stern bearing), Marsodak (also repack stern gland, overhaul sea valves and boiler valves, recondition pintles, renew zinc plates, recondition anchor chain), Golden Dragon (also misc. engine repairs), Kansan (misc. repairs), Hoquiam (also misc. hull caulking and repairs), Oregonian (also engine depth repairs). Drydock for general hull repairs: Dauntless.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Minor repairs not requiring docking: stmr. Prince William. Docked, cleaned, painted, and misc. hull and engine repairs: 7 fishing boats. Misc. hull and engine repairs: 18 fishing boats.

U. S. NAVY YARD, Bremerton, Wash.

Misc. repairs and docking: Saratoga, Lexington, Elliot, Twiggs, Neches. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x 26x11 ft.; 5 delivered July/30.

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; keel 1/1/31 est.; deliver 3/31 est.

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named: 168 L.B.P.; 26 beam; 9 draft; twin Winton diesel engs.: 1600 I.H.P.

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30.

Aras, hull 139, diesel yacht, Hugh J. Chisholm, 243'9" L.O.A. 227'3" L.W.L.; 36 beam; 21'7" depth; 2 Winton 1100 B.H.P. diesel engs; keel 3/19/30; launch 12/8/30 est.; deliver 12/23/30 est.

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B.H.P. Fairbanks-Morse diesel eng.; keel 10/15/30; launch 3/20/31 est.; deliver 4/25/31 est.

Maine, hull 143, sister to above; keel 10/18/30; launch 3/20/31 est.; deliver 4/25/31 est.

Not named hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30.

Not named, hull 145, diesel-electric yacht for Geo. M. Pynchon, New York; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Borinquen, hull 1432, steel passenger vessel for New York and Porto Rico Steamship Co.; 7050 gross tons; keel 1/20/30; launched 9/24/30; deliver Jan. 1/31 est.

Virginia Sinclair, hull 1438, steel tanker for Sinclair Navigation Co.; 6400 gross tons; **launched 10/9/30.**

Not named, hull 1439, sister to above.

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Not named, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hulls 4268-4273, six steel oil barges for Lake Transport Corp.; 4271 launched 5/22/-30; 4270 launched 6/20/30; 4272 launched 6/27/30; 4268 launched 7/20/30; 4273 launched 9/10/30.

Hull 4274, steel carfloat for Central R.R. of New Jersey; launched 9/26/30.

Hulls 4275-4276, two steel barges for Merchant & Miners Transp. Co.; launched 7/24/30.

Hulls 4277-4278, two steel barges for Baltimore and Ohio R.R.; launched 9/19-9/29/30.

Hull 4279, steel dredge for Elliott Machine Corp.; **launched 10/20/30.**

Not named, hull 4280, steel oil tanker for Gulf Refining Co.

Not named, hull 4281, same as above.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel lighter for stock; 85x 26x6 ft.; keel July/30.

One all-welded steel ferryboat for the Seaboard Air Line.

One all-welded steel yacht, owner not named.

COLLINGWOOD SHIPYARDS, Ltd.
Collingwood, Ontario.

Purchasing Agent. E. Podmore.

Hull 86, lock gate lifter for Dept. of Railways and Canals of Canada (Welland Canal): 90 by 66 by 26 ft.; designed to lift gates weighing 500 short tons; keel 12/28/-29; launched 10/7/30; deliver 11/5/30 est.

Repairs: Drydock, port and starboard bow damage repairs, 10 ft. new stem fitted, one propeller blade replaced: stmr. Iocolite. Drydocked, bottom, port and starboard side damage repairs: stmr. Canatco.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2962, 80-ft. cruiser for J. T. McMillan, Detroit, 2 300 H.P. Speedway engines.

Hull 2994, 81-foot commuter boat for N. B. Woolworth; 2 300-H.P. Speedway engines.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Not named, hull 145, steel yacht, owner not named: 108 L.B.P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30.

Not named, hull 146, steel yacht, owner not named; 126 L.B.P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30 est.

Not named, hull 147, steel yacht for E. S. Close, Toledo; 106 L.B.P.; 17'6" beam; 6 loaded draft; 14 M.P.H.; 98 D.W.T.; 300 I.H.P. diesel eng.; keel 11/25/30 est.; launch 4/15/31 est.; deliver 5/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1046 to 1055 incl., 10 standard stock barges 100x26x6'6"; **1 delivered.**

Hulls 1064-1065, two 50-ton whirler derrick boats for New York Central Railroad.

Hulls 1067-1072 incl., six misc. cargo barges for stock; 130x30x8'6".

Hull 1073, 15-ton derrick boat for U.S. Engineers Office, Pittsburgh.

Hulls 1074-1083 incl., 10 hopper type steel coal barges for stock.

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

W. S. Farish, hull 114, steam tanker for Standard Shipping Co., New York; 525 L.B.P.; 74 beam; 28'6" loaded draft; 10.5 knots loaded speed; 18,000 D.W.T.; turbine propulsion; H.P. water-tube boilers. keel 2/24/30; launched 10/11/30; **delivered 11/26/30.**

Hull 119, steel harbor barge for stock; 175x36x12'7-1/8"; keel 5/19/30.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One steel wharf barge for City of Rock Island, Ill.; 230x45x7'9"; **launched 11/3/30.**

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long.

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer.

Hull 261, car ferry for Milwaukee Ferry Co. (Grand Trunk R.R.): 343x56x21'6"; 14 mi. speed; 2200 D.W.T.; 2 recip. steam engs.; 3600 S.H.P.; 4 Scotch boilers, 14'6" x 12'; keel 7/12/30; **launched 11/25/30;** deliver 1/15/31 est.

Not named, hull 268, steel tug, owner not named; 115 x 26 x 15 ft.; one Babcock & Wilcox boiler; 850 H.P. turbine with reduction gear; keel 1/31 est.; deliver 5/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x 26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S.

Engineering Office, New Orleans: 65'6"x 17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

All-welded steel barge for Inland Waterways Corp., 1016 Munitions Bldg., Washington, D.C.; 230 length on deck; 45 ft. molded beam; 11 ft. molded depth, keel laid.

Steel oil tanker for Victor Lynn Transportation Co.; 210 gro. tons; **keel 12/30.**

Two barges for E. T. Slider, 120x30x 7'6".

Ten barges for U. S. Engineers, Rock Island, Ill.; 110x24x5 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 240, deck barge for Bedford Nugent Co.; 100x26x6'6"; keel 8/15/30; launched 9/17/30.

Hull 241, same as above; keel 8/28/30; launched 9/26/30.

Hull 242, same as above; keel 8/30/30; launched 10/1/30.

Hull 243, same as above; keel 9/4/30; launched 10/6/30.

Hull 244, deck barge for stock; 100x26 x6'6"; keel 10/20/30.

Hull 245, same as above; **keel 11/6/30.**

Hull 246, same as above; **keel 11/13/30.**

Hull 247, same as above; **keel 11/16/30.**

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 12/15/30 est.; launch 1/10/31 est.

Hull 249, same as above.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 233 Broadway, New York City.

Augusta, hull 324, light cruiser CL-31 for United States Navy; 10,000 tons displacement; keel July 2/28; launched 2/1-30; deliver Mar. 13/31 est.

Oriente, hull 338, passenger liner for A.G.W.I. Nav. Co., New York; 508 x 70'9" x 39'; 15,380 tons displ.; 16,000 S.H.P.; 20 knots speed; turbo-elec. drive; keel. July 8/29; launched 5/15/30; **delivered 11/20/30.**

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; **launched 12/9/30;** deliver 8/31 est.

Not named, hull 340, sister to above; keel 4/22/30; launch 2/31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; launch 3/31 est.; deliver June/31 est.

Not named, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I H P.; keel 2/31 est.; launch 9/31 est. deliver 1/32 est.

Not named, hull 345, sister to above; keel 3/31 est.; launch 11/31 est.; deliver 4/32 est.

Not named, hull 346, sister to above; keel 5/31 est.; launch 12/31 est.; deliver 7/32 est.

Not named, hull 353, Aircraft Carrier No. 4 for U.S. Navy Dept.; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Excalibur, hull 394, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 11/4/29; launched 8/5/30; deliver 12/15/30 est.

Exochorda, hull 395, sister to above; keel 11/25/29, launched 10/18/30; deliver 1/15/31 est.

Exeter, hull 396, sister to above; keel 8/11/30; launch 3/1/31 est.

Excambion, hull 397, sister to above; keel 10/25/30; launch 8/1/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; **keel 12/6/30;** launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel spring/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Hull 1046, four diesel-electric, single-screw, harbor tugs for Erie Railroad Co.; 96 L B P.; 26 beam; 13'9" molded depth; 1000 H.P. diesel-electric prop.; delivery 8 months; keels 3/27/30; launched Cleveland (No. 1) 7/24/30; delivered 10/23/30; Rochester (No. 2) 7/30/30; No. 3, Scranton, launched 10/4/30; deliver 12/15/30 est.; No. 4, Olean, launched 10/8/30; deliver 12/15/30 est.

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B H P diesel engs.; keel 8/28/30.

Onika, hull 1048, twin screw diesel houseboat for Edsel B. Ford, Detroit; 125 L.O.A.; 22 beam; 4'6" draft; two 250-H.P. diesel engs.; keel 6/21/30; **launched 11/20 /30;** deliver 12/15/30 est.

Not named, hull 1049, two steel, single-screw, harbor tugs for stock; 92 L.B.P.; 23 beam; 12'6" loaded draft; steam eng. 1 Scotch boiler.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Northern Sun, hull 131, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 7/15/30; launch 1/20/31 est.; deliver 1/10/31 est.

Not named, hull 132, sister to above; keel 8/21/30; launch spring/31 est.

Not named, hull 133, sister to above; keel 9/17/30; launch spring/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Brilliant, hull 127, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 4/28/30; launched 11/5/30; **delivered 11/15/30.**

Comet, hull 128, sister to above; keel 5/17/30; launch 12/9/30 est.; deliver 12/30/30 est.

Daylight, hull 137, sister to above; **keel 11/13/30.**

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.

UNITED DRY DOCKS Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Tompkinsville, hull 795, ferryboat for City of New York; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; dbl. comp. eng. 4000 I.H.P.; 4 W.T. boilers; keel 12/19/29; launched 9/11/30; **delivered 11/20/30.**

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3220 I.H.P.; 2 W.T. boilers; keel 3/2/31 est.; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, ferryboat for City of New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 1/15/31 est.; launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Louisiana, hull 85, turbo-electric, twin-screw, tunnel towboat for Mississippi Valley Barge Line Co., St. Louis; 200x40x10'6"; keel 11/28/29; **launched 10/8/30;** deliver 12/21/30 est.

Scott, hull No. 85, diesel-electric stern-wheel towboat for U. S. Army Engineers, Rock Island & Huntington Districts; 90x 20x4'6" molded dimensions; keel 5/26/30; launched 9/6/30; deliver 12/7/30 est.

Fort Armstrong, hull 86, same as above; keel 6/17/30; launched 10/2/30; **delivered at Keokuk, Iowa, 11/20/30.**

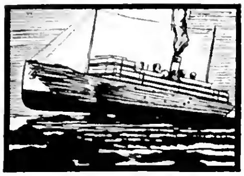
Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30.

Vesta, hull 89, sister to above; keel 10/9/30.

TRADE LITERATURE

California—A Guide to Newcomers. One of the outstanding guidebooks of the year has recently been published by the Panama Pacific Line for use in connection with advertising its all-water route from Coast to Coast. The Book is handsomely printed by the rotogravure process, with many fine pictures, and has a vivid cover in colors. In style it has a literary flavor with apt quotations in verse under many of the pictures. The author is Winfield M. Thompson, well known field agent of the line, and every section of the state of interest to the tourist is clearly and impartially described. Topics of interest cover historical highlights, agricultural and industrial information, and places and objects of general interest. Copies may be had on request.

Lewis-Shepard Floor Trucks— This is a new catalog issued by the Lewis-Shepard Co. of Boston, covering its new and complete line of standard and special floor trucks.



Marine Insurance

Edited by James A. Quinby

The Voyage Insured

Deviation and Substitution of Voyages Under Marine Policies

The River Pilot Speaks

Oh, I'm tired of hearin' praises for these deep-sea-sailor men
With tugs to nurse 'em into port and pull 'em out again,
And all the wide blue ocean for to mis-maneuver in.

I'd like to see some salty off-shore hero of renown
A'navigatin' tule fog to Sacramento town
With unseen land ten feet away, starboard, port, and down.

When you're passin' out your tributes and encomiums galore
Don't overlook the river man whose oft-repeated chore
Consists of layin' courses by the echoes from the shore.

J. A. Q.

IN THE early days, when both shipowners and hull underwriters were venturing into unexplored territory, it was customary to insure hulls under what were known as "voyage policies." Such policies covered the vessel either "from" or "at and from" a given port or place (known technically as the terminus a quo) to a certain named destination, called the terminus ad quem. Any variation from the customary or described route, after the voyage started, was called a deviation, and the underwriter was relieved of liability for loss suffered after the occurrence of a deviation. If a ship departed from her route without the intention of achieving her original destination, even by another route, the maneuver was called a "change of voyage," and the underwriter was discharged from all liability as from the date of change.

If the ship never sails from the named port of departure or if, before sailing from such port, her master determines to proceed to some port other than the named port of destination, the risk under the policy never attaches.

Deviation Now Unimportant

At the present time, hull policies are customarily time policies. A ship is insured from a certain date to a certain date, for a period which is usually one calendar year. Under such a policy, voyages and deviations become irrelevant. In certain exceptional cases, voyage policies may still appear in our modern practice. For example, the obsolete cruiser Missoula, recently brought out of retirement and designed for the scrap-heap, was doubtless insured under a voyage policy for her trip in tow from Puget Sound to San Francisco.

We must not assume that the voyage policy is a thing of the past, however. All cargo policies are, in the last analysis, voyage policies. Even the familiar open or contract policy, by which the importer covers all goods consigned to him, is merely a binding agreement to issue a number of voyage policies, each of which, embodied in a so-called "declaration," includes the description of a voyage and its terminii.

In these voyage policies, however, the danger of deviation has been obviated by a provision common in modern cargo coverage, to the effect that in case of deviation the goods will be held covered upon the payment of a suitable additional premium. With this clause in his contract, the cargo owner need not worry if the ship should deviate. The shipowner still has cause to worry, however, if his vessel deviates from the voyage described in the bill of lading, for, in spite of numerous protective clauses, our courts have consistently frowned upon a vessel which wanders from the straight and narrow path of her agreed voyage. But this, of course, has nothing to do with deviation liability under a cargo policy.

Failure to Sail on Described Voyage

The failure to sail on the voyage described in the policy, however, is not a mere deviation, and renders the policy void. As provided in the Marine Insurance Act of Great Britain,

Sec. 43. Where the place of departure is specified by the policy, and the ship, instead of sailing from that place, sails from any other place, the risk does not attach.

Sec. 44. Where the destination is specified in the policy, and the ship, instead of sailing for that destination, sails for any other destination, the risk does not attach.

The substitution of an entirely different voyage for the one described is so great a variance that the courts refuse to recognize that a contract to insure the substituted voyage was ever contemplated by the parties. There is one notable example in the English reports of a case where the policy was held void on a substituted voyage even where it was provided that "deviation or change of voyage" was to be held covered at a premium to be arranged. (Simon, Israel & Co. vs. Sedgwick and other, 1 Q.B. 303, VII Asp. 219).

In that case an open policy of insurance was written to cover goods "at or from the Mersey or London to any port in Portugal or Spain this side of Gibraltar," thence to the interior. The bill of lading on the shipment in question was to Cartagena, a port beyond Gibraltar. While on that portion of the voyage common to both destinations (i.e., shortly after leaving London) the ship was lost. The cargo owner offered to pay the extra premium under the deviation clause in his policy, but the court held that the voyage insured had never commenced, and that the case was not one of deviation or change of voyage en route.

"The ship," runs the opinion, "so far as these goods are concerned, sailed on a different voyage, and one for which the assured had no right under the policy to declare them. Any different construction would bring a voyage to Havre or Marseilles within the policy, and would entitle and bind the assured to declare under the policy any goods forwarded to Spain via those ports."

Care Necessary in Describing Voyage

A case recently brought to our attention on the Pacific Coast has many points in common with the English decision above cited. In 1924, two Oregon lumber companies, which we shall call A and B, had open cargo contracts with the same insurer. A's policy covered shipments "from Coos Bay or other Oregon ports to any California port," while B's policy covered shipments similarly described but with the addition of the words "or vice versa." The companies were consolidated, and the latter policy was cancelled, leaving the A policy in force. This policy, of course, covered southbound shipments only.

The underwriter's Oregon agent, upon being questioned by the assured, advised the latter that the policy covered north-bound shipments, and the assured accordingly shipped a cargo of lumber from Crescent City, California, to an Oregon port on a coastwise lumber carrier that foundered at sea. The loss was clearly not covered under the policy. The agent's verbal statement, being made long after the policy was written, could not vary the terms of the contract, which covered only southbound lumber.

In this particular case the underwriter, being a decent sort of chap, as most of them really are, decided to pay the loss even if no technical liability existed under his policy. The policy, of course, has been revised, and Messrs. A. and their insurers expect no further difficulty.

The cases cited herein are valuable as warnings to both underwriters and their clients. The buyer of insurance, either through careful personal examination or through the assistance of competent brokers, should assure himself that his policy accurately describes the voyage that he wishes covered.

She Forgot To Duck

To our list of peculiar cases must be added Owen F. Burke vs. Southern Bell Telephone and Telegraph Co., 1930 A.M.C. 1830, which concerns the sad plight of a river steamer which pursued her peaceful way up the Alabama River. The telephone company had erected poles on opposite sides of the river, and strung its wires across the path of the innocent oncoming vessel. The wires caught in the smokestacks and damaged the vessel, whereupon the vessel owners sued the telephone company in admiralty. The telephone company immediately filed exceptions questioning the admiralty jurisdiction of the damage, which occurred, they said, not in the water but in the air.

The District Court (Alabama), finds that the case is properly cognizable in admiralty, and quotes from the Plymouth (70 U.S. 20) and other cases as follows:

"The jurisdiction of the admiralty over maritime torts does not depend upon the wrong having been committed upon the high seas, or other navigable waters. .

Every species of tort, however occurring, and whether on board vessel or not, if upon the high seas or navigable waters, is of admiralty cognizance. . . . .

The negligence of itself furnishes no cause of action; it is damnun absque injuria. . . . The whole, or at least the substantial, cause of action arising out of the wrong, must be complete within the locality upon which the jurisdiction depends, on the high seas or navigable waters.

Pursuing the same thought, it was said in Rundell vs. La Compagnie Generale Transatlantique, 100 Fed. 657:

'The locus of the tort therefore which must always be determined by the place where the injury and damage arise, rather than where the negligent act is committed. . . . . The damage is the substance and consummation of the injury, and from that alone springs the right of recovery.

I conclude that in tort actions it is the place where the injury was sustained that gives the court jurisdiction regardless of where the negligent act was done, and regardless also of whether the instrument or structure used as an instrumentality to accomplish the injury was located in the navigable waters or was n aid to navigation or maritime commerce."

The decision does not consider the William Eden-orn (1926 A.M.C. 1475) or the Norfolk-Berkeley ridge case (1928 A.M.C. 1636) in both of which ship-vners were allowed to maintain suits in admiralty gainst owners of bridges which obstructed navigable aters, resulting in damage to vessels. It is interest-ig to note that the telephone company could not have ied the shipowner in admiralty for damage to the ires. (Kanagana Maru, 1927 A.M.C. 410).

One-Minute Interviews

Emmet J. Cashin, chief high mogul of the Shipown-'s Claims Bureau, seemed perturbed. He ran ner-ous fingers through his curly hair, and chewed sav-gely on an ever-present cigar. (Some people claim he ses the same cigar, year after year. And some people aim that Wilfred Page never renews that derby. But ve seen both these ornaments changed.)

"A P. & I. underwriter," sputtered Emmet, "doesn't ind paying legitimate claims. We realize that if there ere no claims the need for our services would cease exist. But these crooks and tramp seamen that drift om one ship to another, always getting suspicious juries and threatening suit— — . Sometimes they're peaters. We have to watch those babies. I've devel-ed an alphabetical file covering all the personal in-ry cases we ever handled, and when a claim comes , I check it to see if the claimant has a prior record ith us.

Once in a while we get a tip on these repeaters from n outside source. For several months we've been sub-ribing to a publication put out by the Railway Claims gents Association. A couple of weeks ago a claim me into the office from a passenger named Carson, ho was alleged to have slipped on a marble on the oor of the dining saloon of one of our vessels and riously injured his back. He had no prior record ith us, but on checking through the railway maga-ne, I found that on three separate occasions he had it in claims against railway companies for back in-ries due to slipping on a banana peel while on a ain. The inference was that he carried an assortment banana peels and marbles around with him to help y his travelling expenses. The funny thing about it as that he didn't even use an assumed name, but ve the same name and address in all the claims, in-uding the one he made against us."

Study Class Activities

Members of the Association of Marine Underwriters of San Francisco, at their Study Class meeting of November 17 were addressed by Frank Tracey and J. A. Lombard.

Mr. Tracey, who is the United States Surveyor of Customs at San Francisco, described the difficulties confronting customs officers in their attempt to frustrate the activities of smugglers at Pacific Coast ports. He pointed out that while the customs inspectors are anxious to prevent the smuggling of valuable goods which the casual traveler often attempts as a sporting proposition, the government is more concerned with the importation of narcotics, which is a serious menace to the health of our citizenry. Mr. Tracey told several interesting anecdotes concerning the ingenious hiding places which law-breakers devise aboard ship and expressed the opinion that steamship companies could be more stringent in their exclusion of drug addicts from service on transpacific vessels. He closed with an appeal to underwriters to use their influence with carriers to achieve a greater measure of success in the prevention of narcotics importation by checking the evil at its source in Oriental ports.

The second speaker of the evening, Mr. Lombard, was formerly a coffee merchant and is now technical adviser to the General Steamship Corporation in San Francisco. In line with the Association's policy of familiarizing its members with the origin and peculiarities of various insurable commodities, the speaker had for his subject "Coffee, Tea, and Spices." The major portion of his remarks had to do with coffee, its manner of preparation for shipment and its susceptibility to contamination. He expressed the opinion that some form of policy should be worked out by which the coffee owner could insure his shipment from the plantation to the ultimate market and thus avoid disputes with underwriters as to where the contamination occurred. It was noticeable that this suggestion was not greeted with enthusiasm by the underwriting members of the audience.

Mr. Lombard emphasized the fact that coffee will pick up various odors without being in actual contact with other commodities, and he cited instances where shipments of coffee had been contaminated by other shipments stowed in separate holds of the carrying vessel. After discussing the shipping conditions in various ports in Central and South America, and answering numerous questions as to types of damage, Mr. Lombard concluded his remarks by a brief discus-

sion of the preparation and shipment of tea and spices, pointing out that while tea is very susceptible to contamination, it is usually packed in wooden, metal-lined cases which offer a greater protection than the bags in which coffee is shipped. Spices, according to the speaker, are excellent risks from the insurer's viewpoint, since they are not to any great degree susceptible to contamination from other goods.

The speakers at the meeting of December 1 were C. A. Jones of Parrott & Company, and Harry Haviside of Haviside & Company.

Mr. Jones favored the Class with a brief but carefully worded exposition of total losses under marine policies. He classified such losses under the subjects of Hull, Cargo, and Freight, and further distinguished between actual total loss, based upon the complete destruction of the property, and constructive total loss which arises under English hull policies where the cost of repairing a vessel after an accident exceeds her value when repaired.

Harry Haviside, the genial president of Haviside & Company, ship chandlers and salvage experts, illustrated his remarks on the salvage of small vessels by showing motion pictures of the work of his wrecking barge, Haviside No. 4, in salving the fishing vessels, Paladini and the Lorenz, after these craft ran ashore on the Pacific Coast. The Class received a clear idea of the methods used in raising and floating these vessels and of the excellent equipment and ability of the Haviside No. 4.

Freights, Charters, Sales

December 27, 1930.

THE following steamers have been reported fixed with grain to U.K.: A steamer from San Francisco to U.K. Cont. (reported), 25/-, Dec./Jan.; Japanese str. Cape Town, Portland to U.K./Cont., Dec., Balfour, Guthrie & Co.; British str. Dalryan, San Francisco to U.K./Cont., Dec., Strauss & Co.; British str. Koranton, Vancouver, B.C., to U.K./Cont., 22/6, prompt, F. J. Heyward, Ltd.; British str. Silksworth, Vancouver, B.C., to two ports U.K./Cont., 23/9, Jan.; a Reardon Smith str., Vancouver to Greece, 24/3, Jan., Louis Dreyfus & Co.; German str. Adalia, Vancouver, B.C., to U.K./Cont., Dec., Kerr, Gifford & Co.; a Reardon Smith str., Vancouver, B.C., to U.K./Cont., 22/6, Jan., Canadian Cooperative Wheat Producers' Assn.; Norwegian str. Romulus, North Pacific to U.K./Cont., Jan.; British str. Glenmoor, Vancouver, B.C., to U.K./Cont., Dec.-Jan.; British str. Langleeford, Vancouver, B.C., to U.K., 22/9, option Havre/Hamburg, range 22/-, Jan./Feb., Louis Dreyfus & Co.; British str. Langleegorse, Vancouver, B.C., to U.K./Cont., 22/9, Jan./Feb.; British str. Crown of Galicia, Portland to U.K./Cont., 23/9, Jan., Kerr Gifford & Co.; British str. Stonepool, Portland to U.K./Cont., 22/6, Dec.; British str. Holystone, Portland to U.K./Cont., 22/6, Jan.; British str. Orient City, Vancouver to U.K./Cont., 23/6; Continental Grain Co.; British str. Atlantic City, Vancouver to U.K./Cont., 22/6, Jan., Canadian Cooperative Wheat Producers Assn.

The Japanese m.s. Kohwa Maru has been fixed with wheat from Columbia River to Shanghai, $3.60, Dec., by Mitsubishi Co.

The American str. Eureka has been fixed with lumber from Tillamook, Coos Bay and Eureka to Manzanillo and Guaymas, prompt, by Hammond Lumber Co.

The following steamers have been reported fixed with lumber to the Atlantic: American m.s. Silverspruce, North Pacific to U.S. north of Hatteras, January; Norwegian m.s. Guldborg, British Columbia to New York, Dec., Seaboard Lumber Sales Co.

The following time charters have been reported: British m.s. Bonnington Court, delivery North Pacific redelivery U.K. Cont., lumber, $1.75, prompt, H. R. MacMillan Export Co.; Norwegian m.s. Soloy, one trip, delivery North Pacific redelivery U.S. north of Hatteras, Dec./Jan.; Norwegian str. Somerville, one trip delivery British Columbia, redelivery Japan/China, Feb.; British m.s. Nordhval, one trip, delivery British Columbia, redelivery U.S. North of Hatteras, $1.60; Jan./-Feb.; British str. Ousebridge, one trip, delivery North Pacific, redelivery North of Hatteras, lumber, $1.05, Dec., Seaboard Lumber Sales Co.

The following sales have been reported: American sc. Forester and American sc. Philippine from Wolff, Kirchman & Co. to Captain A. O. Daweritz.

PAGE BROTHERS, Brokers.

COURSE IN STEAM TURBINE AND POWER PLANT OPERATION

Under the able instruction of J. M. Dodds of the General Electric Company of San Francisco, the Technical Department of the Humboldt Evening High School, San Francisco, has started a class in Steam Turbine and Power Plant Operation. The class meets twice a week, the opening lecture being January 7. The subjects to be covered in the spring semester include: Steam turbine drives, Turbine electric drives, Gears for large powers; Generators for high speeds; Boilers; Chemistry of boiler water; Fuels; Lubricating oils. The lectures will be supplemented by slides and films as well as some trips to inspect practical installations and applications.

TRADE LITERATURE

Industrial Control Catalog GEA-606B. This is a reprint of Industrial Control Section of General Catalog 600A, pages 825 to 985, and contains information on representative lines of industrial control manufactured by the General Electric Company, also instructive matter on the care and operation of control devices, wiring diagrams, reference tables, list of publications, etc.

TRADE NOTES

Marine Sales Assistant. The Sperry Gyroscope Company has announced from headquarters in Brooklyn, New York, that O. B. Whitaker has been made assistant manager of the Marine Department with supervision over sales on the Great Lakes, West Coast, and Canada. He is assistant to Robert B. Lea, manager of the Marine Department in the company. Mr. Whitaker has been

O. B. Whitaker.

with the company in various capacities since 1913, and has a wide acquaintance in the marine fraternity.

Centralization of Manufacture. The Babcock & Wilcox Co. of New York has announced that the manufacturing operations of the Fuller Lehigh Company, its subsidiary, are to be transferred from Fullerton, Pennsylvania, to the Barberton, Ohio, works of the parent company early in 1931. The management, engineering, and sales departments will be moved to New York. E. G. Bailey, president of the Fuller Lehigh Company, has been elected a vice-president of the Babcock & Wilcox Company. According to the announcement, the Fuller Lehigh Company will continue to function as a separate concern under its present name.

New Officers Elected—The American Bauer Wach Corporation, organized some time ago to introduce the Bauer Wach method of increasing the power and reducing the fuel consumption of vessels equipped with reciprocating steam engines by the installation of exhaust turbines, has recently been reorganized and announces the following officers elected:

Fills New Position—William E. Colley has resigned his position in the Marine Sales Department of the Westinghouse Electric & Manufacturing Company, South Philadelphia Works, to accept a position as Sales Engineer with the Kingsbury Machine Works of Philadelphia. Mr. Colley has had a long and varied experience in marine work, having gone to sea as both a licensed engineer and in the navy. For the past eleven years he has been continuously employed in marine service and sales engineering work with the Westinghouse company.

Changes in Pacific Coast Offices. The Lincoln Electric Company of Cleveland has announced the appointment of S. H. Taylor, Jr., to succeed W. S. Stewart in charge of the Pacific Coast affairs, with headquarters at 812 Mateo Street, Los Angeles. Mr. Stewart has been appointed district manager of the Cleveland territory.

L. P. Henderson has been appointed manager of the San Francisco office.

The Ship A. J. Fuller. The arrival of the Columbian Rope calendar is always an interesting occasion during the yearly routine, as it always carries with it a message from the past in a picture by the well known marine artist, Charles Robert Patterson, of another of America's famous ships of sail. The 1931 Columbian Calendar portrays the ship A. J. Fuller built at Bath, Maine, in 1881. A history of her thirty-seven years active service accompanies the calendar.

New Selling Agency. A firm has recently been formed in Detroit for the purpose of serving as agent for marine products, including motors, both outboard and inboard. H. L. Baldwin is vice-president and general manager of the firm, which plans to organize a highly efficient staff to service buyers of the company's line of equipment.

A Thousand Round Trips

It is seldom, indeed, that any ship has the opportunity to fly the long, blue "1000" pennant, signifying the sailing of the vessel on her thousandth trip on the same route. Usually they are transferred or changed into some other type of service before that eventful date rolls around. But when such an occurrence does transpire, it evolves itself into a "diamond wedding" celebration for the line, the crew, and the ship herself.

To give an idea of just what such a record means, even to a ship on a comparatively short run, the Los Angeles Steamship Company has prepared a set of figures for the coastwise cruiser Yale which sailed from Los Angeles harbor November 25 on the start of her thousandth trip.

During her nine years in the service, she has steamed more than 1 000 000 miles.

She has carried over 500,000 passengers.

She has served over 2 000,000 meals.

During the past year alone, 52,000 pounds of beef were served from her larders; 5000 gallons of milk were used; 1952 gallons of cream; and 10,760 pounds of butter. Multiplied by the full nine years of her 1000 voyages,—but why figure!

During the entire period, it is reported that she has suffered no serious mishap and has been laid up only for ten to fifteen days annually for a general overhauling.

On her thousandth sailing, as the Yale backed from the wharf where watchers had gathered, the huge sixty-foot pennant hung listless until she turned in the stream, when the breeze flung it out to its full length to greet the boom of whistles and sirens.

Pacific Marine Personals

AFLOAT AND ASHORE ∾ BY PAUL FAULKNER

It is interesting to note the length of service of some of our American-Hawaiian friends. Here we are: BERNARD MILLS, who joined the company in October 1900, has never been out of its employ since that date and for the past fifteen years has been superintending engineer; J. E. CALWAY, port steward, 27 years; CAPT. N. J. KANE, marine superintendent, 26 years; R. D. LAPHAM, president, 26 years; T. G. PLANT, operating manager, 23 years; F. A. HOOPER, district manager at Los Angeles, 23 years; W. J. MAHONEY, treasurer, 20 years; J. E. CUSHING, vice-president, 14 years; W. D. CLARK, assistant traffic manager, 11 years; and J. R. FITZGERALD, San Francisco district manager, 10 years. First officials of the company when it was organized in 1900 were: President, George Dearborn; Manager, Capt. W. D. Burnham; Traffic Manager, H. E. D. Jackson; and Superintending Engineer, V. F. Lassoe, co-designer with Erickson of the "Monitor" of Merrimac and Monitor fame. Of these, all but Jackson, who resides in New York City, are now dead.

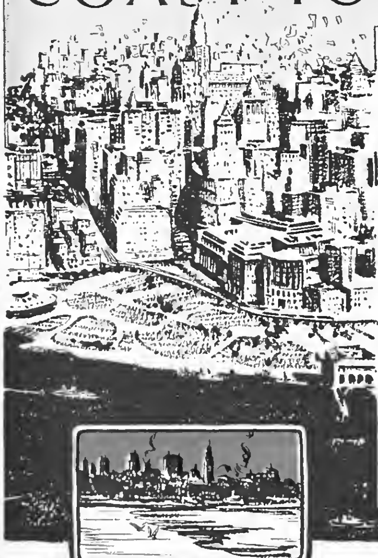
FRED CORDES, partner in the firm of Cordes Bros., has opened offices in Wilmington, California, where he will have charge of the company's southern California affairs. JOHN CORDES is directing the northern California business, with offices in San Francisco. Cordes Bros. are marine equipment manufacturers' representatives. As we go to press it is announced that Cordes. Bros. have been appointed Los Angeles harbor representatives of the Hillcone Steamship Company, Pacific coastwise tanker service. The Cordes boys have a host of friends in West Coast marine circles and their expansion in activity comes as good news.

H. H. PIERSON, who has been connected with the traffic department of Williams, Dimond & Company at San Francisco, is now traffic manager, succeeding the late Warren Clark. Pierson, in West Coast shipping for many years, was formerly with the Dollar Lines in the freight department.

A. E. STOW, assistant to the operating manager of the American-Hawaiian Steamship Company, recently spoke on the importance of Pacific Coast shipping at a meeting of the San Francisco Chapter of the California Safety Society. In conjunction with Stow's address he presented a moving picture titled "Ocean Cargo," filmed to show American-Hawaiian service.

Fred Cordes of Cordes Bros. in charge of Southern California affairs, now located at Wilmington, where his firm is agent for the Hillcone tanker line.

At the Propeller Club Christmas party, Commercial Club in San Francisco. Port to starb'd we have W. Edgar Martin, Weaver Marston, Bryant O'Connor, and Edward J. Kraus. Looks like Eddie just told one of his famous stories.



Official News *of the*
PROPELLER CLUB *of* California

From Fo'c's'le to Footlights—Propellers Put on Pleasing Playlet

Talent recruited from membership entertain fellow members at second annual Christmas banquet attended by more than two hundred Propellers

The Cast Includes the Following Propellers:

1. Selections—Propeller Club Orchestra.
2. Vocal Selections—Charles Bulotti.
3. Wet Wash—An original version of a Chinese Laundry up to date.

Cast of Characters in Order of Their Appearance:

Ah Sit, Chinese laundryman ... Louis Steiger
Hun Lo, his partner in crime... Bert Anderson
A customer ... Emmet Britton
Budda, God of Joy ... Frank Fox
Revenue Officer ... Mel Reed

4. Floradora Sextette.
Scintillating beauties and Gay Boys of the Gay '90's, include the following Propellers:

Bern DeRochie	Carl Lane
Emmet Britton	Jack Dorward
Louis Siversen	Edgar Martin

5. Dr. Alexander Schwartz
Master Mind and Prestidigitator Extraordinary.

Reading from left to right these relics of the gay '90s are: Jack Dorward, Eddie Martin, Louis Siversen, Carl Lane and Bern DeRochie.

The crew of the U.S.S. Leakabit made a bold bid for honors with their presentation of the Minstrel Show before the Propeller Club.

6. Watch Below (Aboard the USS LEAKABIT)
The boys aboard the USS. LEAKABIT are rehearsing for a Minstrel Show to be given ashore and the action takes place during the final rehearsal on board.

Interlocutor and Director—Bert Anderson

Ends

Dick Glissman, Bern DeRochie, Jack Dorward, Hugh Brown

Soloists

Tom Short, Carl Lane, Leo Baldwin, Mel Reed

Members of the crew

Fred Kobely, Julian Theall, W. R. Muir, J. M. Costello, W. E. Martin, Emmet Britton, L. K. Siversen, Capt. B. Levitin, A. J. Boge

Pirate—Albert J. Porter

Accompanist—Joe Hollings

STAFF

Stage Manager ... Frank De Pue
Assistant Stage Manager ... Pete Harding
Electrician ... Jerome Lalor

Pertinent Propeller Club Paragraphs

Barney's constant grin explained. Good luck to him 'n hiz 'en!

CAPTAIN BARNEY LEVITIN, head man of ferries on the Bay of San Francisco, is to be married to Miss Francis Garfinkle. Barney says this is a SECRET so we want everyone to know about it right away.

H. B. JONES and DARRELL DE MARTINI assisted CAPTAIN WALTER J. PETERSON of the Marine Service Bureau, maintained by the Pacific American Ship Owners Association, in making the annual distribution of Christmas presents to the patients of the San Francisco Marine Hospital. Cigarettes, tobacco, and candy brought cheer to those abed. The Propeller Club of California committee brought along a group of theatrical entertainers, whose songs and acts meant a great big lot to the success of the visit. Propellers who joined in the trip were: V. W. HOXIE, RALPH MYERS, JAMES A. CRONIN, CAPTAIN STANLEY ALLEN, RUSS PRATT, WILLIAM MUIR, BEN HEDSTROM, FRANK FOX, CAPTAIN A. T. HUNTER, J. F. McCONKEY, HUGO PALADINI, RAY GUNZEL, ROBERT DORWOOD, KARL EBER.

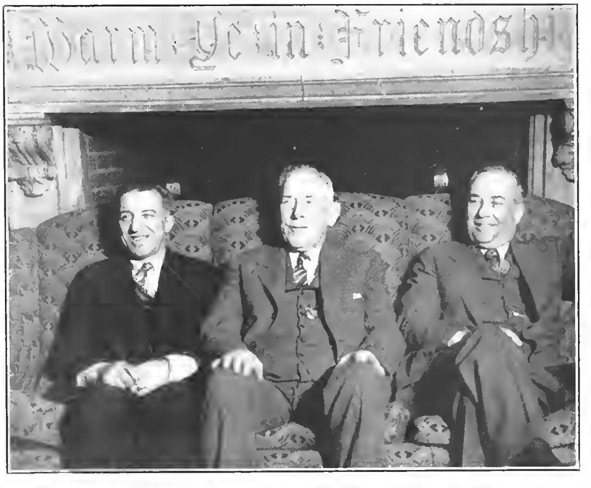
New members signed on the Propeller Club roll are the following: CAPTAIN CHRIS CHRISTIANSON, FRED BURDEN, CAPTAIN W. W. COUSINS of Eureka, and CAPTAIN W. W. FLYNN.

—PC—

GEORGE ARMES secured a full-sized ship wheel with brass mountings to be the background for an impressive clock which MAX ORRISCH is providing for the clubrooms of the Propeller Club. The ship wheel is the seal of the organization and, with the clock in place, makes a beautiful appointment for the rooms.

—PC—

With the new year the scope of activities of the Propeller Club of California will be enlarged. Embodied in the program will be a series of educational subjects pertaining to the American merchant marine.



"Warm Ye in Friendship"—appropriately describes the spirit of the Propeller Club of California's Christmas Dinner, held at the San Francisco Commercial Club. Here we have Joseph Dolan, Fred Hansen, and Luke Biggins wreathed in holiday smiles.

JOHN E. RYAN, general passenger manager of the Matson Navigation Company, returned to his San Francisco headquarters last month from a three-weeks tour of Matson branch offices in the eastern states. His trip was to make final preparations for the operation of boat trains starting in January and to check the business outlook for the coming Hawaiian season. Boat train bookings are progressing satisfactorily, stated Ryan, and he announced that three of the all-Pullman coast-to-coast specials will be operated to San Francisco this season, connecting with the fast liner Malolo on her sailings for January 24, February 7, and February 21. Discussing Hawaiian travel, Ryan said, "Although general travel business has tended downward from the peak of 1929, we anticipate a very substantial volume of business during 1931. Advance bookings at the end of 1930 compare favorably with a similar period a year ago. In fact, all of the 1930 Hawaiian traffic held well above the general decline in passenger movement and was very little behind the peak of 1929."

REGINALD BACK, head of the Union Steamship Company on the Pacific Coast, welcomed CAPTAIN A. T. TOTEN and his new command —the liner Monowai—to San Francisco on December 19. The Monowai was from Sydney via New Zealand, Rarotonga, and Tahiti. The new vessel for the West Coast trade is 500 feet long and carries 225 first cabin passengers, 100 second cabin, and 100 in third. Her commander, Captain Toten, was formerly master of the Union liner Tahiti, and it was his excellent judgment and seamanship which saved the lives of 103 passengers and the crew of 150 when the Tahiti foundered in 50 fathoms in the South Seas last August.

Welcomes the Union liner Monowai—Reginald Back, head of the Union Steamship Company, headquarters San Francisco.

"BILL" McSTAY, publicity director for Dollar Steamship Lines, Inc., Ltd., (note this time the firm name is correct), is telling the world about the good ship President Hoover, which took to the water December 9 at Newport News. McStay's presence "back East" is noted from the reams of space appearing in the American press. It is interesting to know that one of "Bill's" first publicity successes was visiting every state in the Union as advance man for the old-time play "Way Down East."

H. S. Scott, president of General Steamship Corporation, San Francisco. Lines represented by Harry Scott serve "700 Ports on the Seven Seas."

AL. S. GUNN, general manager of the Union Plant, Bethlehem Shipbuilding Corporation, presented the Marine Department of the San Francisco Chamber of Commerce with a ship bell, which is to be tolled whenever there is a marine accident on the West Coast. This is like the custom at Lloyd's of London. The bell has been appropriately inscribed and now hangs conspicuously at the marine exchange. Beneath the bell there is to be a register of information on all vessels lost, covering officers, crew, and the ship. HUGH GALLAGHER, RALPH MYERS, and FRANK O'CONNOR, all members of the marine committee of the Chamber of Commerce, supervised the installation of the bell

J. R. FITZGERALD, general freight agent of the American-Hawaiian Steamship Company of San Francisco, attended the National Wool Growers Association meeting in Colorado Springs last month. Two hundred and fifty delegates from all parts of the United States were present.

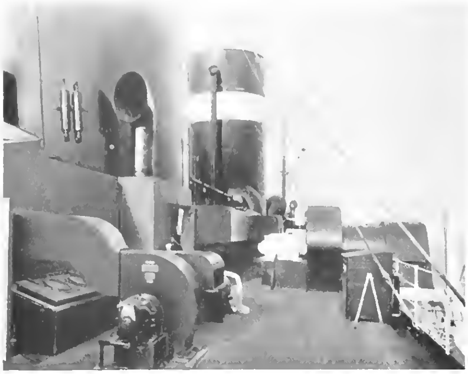
"Joe" Carleton of the Matson liner Sonoma, under that flag for thirty years.

ALBERT V. KASTNER has recently been appointed manager of the Marine Department of the Cork Insulation Company of New York. Just prior to his appointment he had been serving in the office of Director of Naval Communications, Navy Department, Washington, D.C.

Lieutenant Kastner graduated from the United States Naval Academy in 1922, and served four years thereafter as engineer officer on the U.S.S. Sturtevant, which operated with the Naval Detachment in Turkish waters and with the Scouting Fleet. His next duty took him to Hawaii as aid to Commander of the Mine Squadron. In 1928 he returned to the Postgraduate School at the Naval Academy to take a course in engineering.

Lt. Albert V. Kastner.

CAPTAIN WILLIAM FISHER, supervising inspector of hulls and boilers with headquarters in Seattle, has appointed CAPTAIN SYDNEY M. HIGGINS as local inspector of hulls at Juneau, Alaska, succeeding Captain George Morgan, transferred to Seattle as assistant inspector of hulls. Captain Higgins was graduated from the United States nautical schoolship St. Mary's in 1903. Until 1905 he sailed before the mast in the four-masted bark Juteopolis. From 1905 to 1917 he was officer in steam with various grades in service on Atlantic and Pacific routes. In 1917 he was hull inspector for the United States Shipping Board and later served as hull inspector at the Todd Dry Dock & Shipbuilding plant in Tacoma. In 1918 Captain Higgins was master of the Hyauvis, operated by W. R. Grace & Company.



Do They Sleep Soundly?

When your passengers get up in the morning are they refreshed from a good night's sleep? If they have been sleeping on the boats equipped with Sturtevant ventilating fan, the chances are that the fresh cool sea air has filled them with new zest and vigor.

Sturtevant Ventilating equipment has been the standard by which all other systems have been measured for over fifty years. They are both quiet and efficient. We put into them the experience gained from sixty-six years of building air handling equipment.

A request will bring you complete information on this very important subject of marine ventilation.

B. F. STURTEVANT CO.

HYDE PARK, BOSTON, MASS.

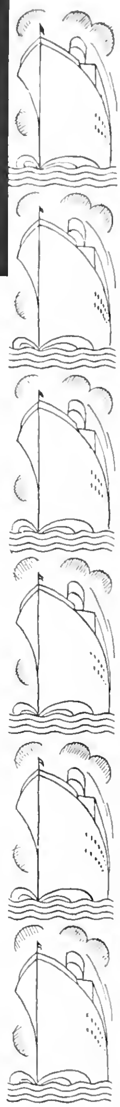
Plants at: Berkeley, Cal. Camden, N.J. Framingham, Mass. Galt, Ontario Hyde Park, Mass. Sturtevant, Wisc.

Offices in Principal Cities

Sturtevant

(REG·U·S·PAT·OFF·)

MARINE EQUIPMENT



FAST SERVICE

..7 Matson liners to Hawaii

THERE'S never any waiting when you want to go to Hawaii. Seven Matson liners, including the luxurious 4-day Malolo, plow a continuous wake from San Francisco to Honolulu. You can always find a Matson sailing that suits you.

Deck sports, movies, dancing, will enliven your voyage. In your stateroom, you'll find the comforts of home. You can have a great trip on one of these Matson liners. All-expense tours are offered in great variety.

Gateway to the South Seas

From Honolulu it is not far to Samoa. Beyond Samoa lie Fiji and Australia. You can book on Matson ships all the way—with generous stopovers and everything arranged in advance.

Ride the surf at Waikiki!

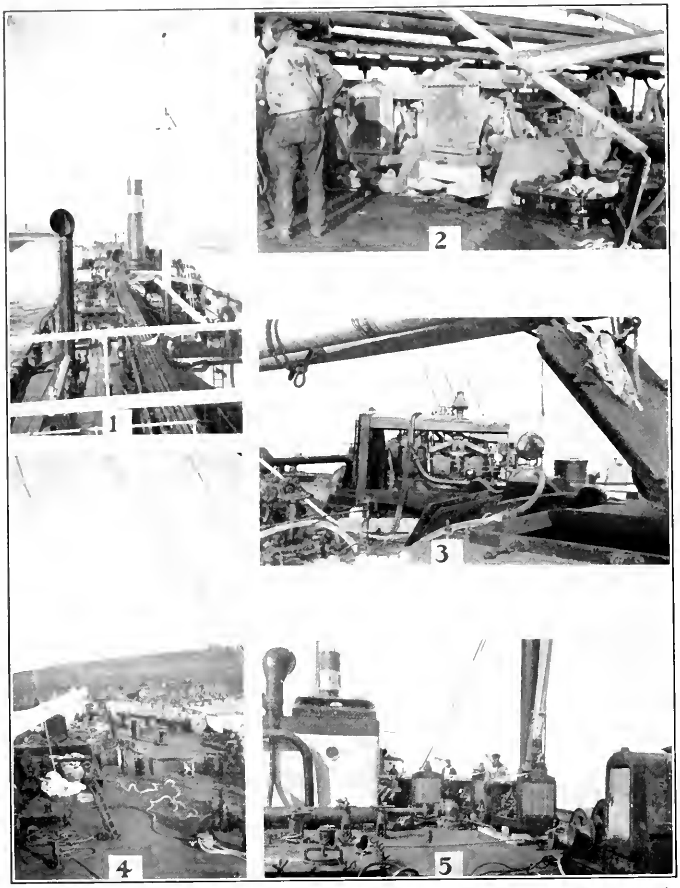
Every day in the year, bronzed, happy visitors ride the surf at Waikiki. The average temperature of the water is 75 degrees—just what it should be for comfort.

MATSON LINE

25 steamers . . fastest service

HAWAII - - SOUTH SEAS - - AUSTRALIA

San Francisco Los Angeles
Portland Seattle



(1) View along the deck of the Tamiahua showing the heavy seas breaking over the stern. (2) and (3) The engine-driven air compressors which were used for filling the cargo tanks and supplying air for the operation of the steam steering gear. (4) View from the bow of the Tamiahua showing the lines to the bluff. (5) A view of the deck with some more of the engine driven compressors in the foreground.

No Cure—No Pay

(Continued from Page 15)

and a depth of 39 feet, and her cargo tanks have an enclosed volume of 727,106 cubic feet. The volume of air maintained at 7 to 16 pounds pressure was probably about 400,000 cubic feet. However, these Rix compressors with their LeRoi engines were equal to the strain and not only lifted the Tamiahua off the beach, but kept her afloat until she was safely in dry-dock at San Francisco.

The high line to the Tamiahua was a very busy line. Although the distance, as stated, was only 900 feet, a careful check of the number of trips made by the trolley would indicate that the total distance traveled by that useful device was over 231 miles.

Monday, November 24, was the first day that it was possible to take accurate soundings around the vessel or astern, and these soundings revealed the fact that the Tamiahua had worked in over a reef with 18 feet depth of water, which was located about half the ship's length astern, and had grounded on the beach with about 18 feet of water forward and about 25 feet aft. It was therefore necessary to drag the vessel over this reef avoiding a 15-foot hump that lay directly astern. The edges of this reef were marked with flag buoys as was the 15-foot hump.

To guide the vessel over this reef two heavy beach gears were placed 2500 feet off each quarter of the Tamiahua and a 300-fathom 10-inch manila line was led from the bow to a deadman ashore; with a 2400-foot, 15-inch manila tow line fast to the stern for the salvage steamer Peacock and towboat Sea Ranger.

To work the vessel clear of her strand ideal weather was required. In this the salvors were very fortunate as on Tuesday, November 25, the day the vessel floated, absolute calm and a smooth sea prevailed. Operations started the night before in blowing out the forward tanks and lightening as much as possible the after end of the vessel; and as soon as the tide started to rise the pumps were started in the engine room. About 8:30 in the morning, with a heavy strain on the beach gears and with the Peacock and Sea Ranger towing, the Tamiahua was gradually worked offshore until the stern grounded on the 18-foot ledge. To raise the vessel over this ledge the air was vented in the forward tanks which settled the bow and raised the stern. With a heavy strain maintained on the beach gears and the Peacock and Sea Ranger pulling to their utmost, the vessel was raised over the ledge until she grounded just forward of amidships. The air was then applied to the forward tanks and the tanker literally boosted over the ledge. By holding the head line the stern was swung clear of the 15-foot hump; and the vessel finally pulled clear of the beach about 10:20 a.m.

The salvage operations as carried out on the Tamiahua embodied practically every point which tends to enhance a salvage award. First there was danger in several forms; namely, the danger to which the salved property was exposed—not only was the vessel in danger of breaking up by the elements but there was an ever-present danger of explosion as all tanks were full of gas which was mixed with air in an explosive mixture by the compressors used to force the water out of the tanks, the danger of fire and explosion due to the gasoline equipment necessary on board for salvage operations, and the danger to the salvor's equipment and personnel which was always present due to the high seas and possible explosion. Second, there was the element of skill involved in several ways; namely, the skill used in floating the vessel over the reef; the skill used in pumping out the flooded compartments and the skill used in guiding the vessel through the only available channel.

49% OF AMERICAN SHIPBUILDING FOR PACIFIC AMERICAN SHIPOWNERS

Pacific Marine Review

FEBRUARY 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII — FEBRUARY, 1931 — NUMBER 2

Contents

ANNUAL INDEX for Vol. XXVII—1930—will be published separately and will be sent to those mailing in requests prior to MARCH 1, 1931.

Official Organ Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

500 Sansome Street, San Francisco

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Official Organ Shipowners' Association of the Pacific Coast

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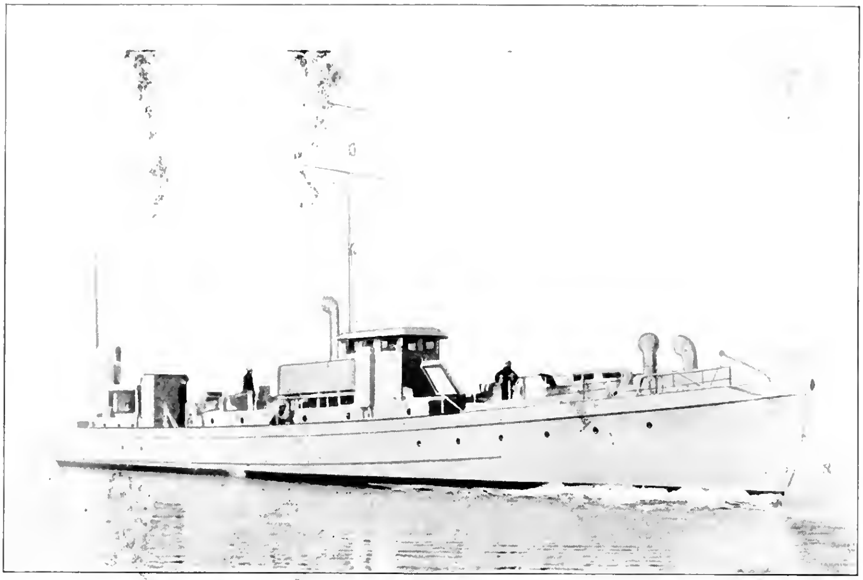
Columbia River entering the Cascade Mountains
Looking Westward downstream at Sunset



U. S. Coast Guard Cutter "Smith" 110' Powered by three Hall-Scott "Explorer" reduction gear engines

Pacific Marine Review

VOLUME XXVIII | FEBRUARY, 1931 | NUMBER 2

Editorial Comment » » »

The Load Line Muddle

ON March 2, 1929, a Load Line Act was passed by Congress. At the hearings preliminary to the passage of this act, shipowners, shipbuilders, and technical experts testified to the need under such an act for time to set up the necessary machinery. Congress therefore very wisely made the Act effective 18 months after its passage, or September 2, 1930.

In Section 3 of this act the Secretary of Commerce is directed to formulate regulations for its administration. These regulations were finally approved by the Secretary of Commerce, August 20, 1930, and thereafter printed and issued on September 1, 1930, to become effective September 2, or the next day. Before the regulations were in the hands of a single shipowner fines became due under the act and there was immediate and mandatory imposition of those fines.

Now, these regulations are not simple. The technical aspects of many of the rules are absolutely unintelligible to the officials of the customs who are charged with the duty of collecting the fine. The only phase of the case upon which such officials can pass judgment is the possession or nonpossession by the owner or master of an official certificate showing that his vessel has been surveyed, marked, and the marks certified under these Load Line Regulations.

The regulations appoint the American Bureau of Shipping to make the surveys and assign load lines. A very wise appointment. The American Bureau has a number of experts well qualified to perform this work. These experts, however, are all very busy men on the regular work of the Bureau. Obviously, they cannot at a moment's notice survey and mark load lines on several hundred ships. That job, under the regulations, might easily be spread over eighteen months to two years.

The situation as developed for the American merchant marine by the dilatory red tape tactics of the Bureau of Navigation of the Department of Commerce is this:

Practically all American ships clearing in the foreign trade are outlaw ships, subject to a fine of $500 for each clearance from an American port;

The Collector of Customs at any American port may, if he sees fit, refuse these vessels clearance until such time as they are surveyed and marked.

Fines are now being assessed against most American vessels and many foreign flag vessels under these regulations. The only recourse open to the shipowner with respect to these fines is to enter what is known as a "remittance procedure." Each such procedure costs $25 and considerable time and worry.

Congress is being petitioned to postpone the application of these regulations for twelve months to give the American shipowner an opportunity to get his vessels surveyed and marks affixed. This petition should be granted promptly. American vessels in foreign trade have enough competition without being burdened by such inept methods of applying regulations. The Load Line Law is wise legislation; let's not spoil it by impractical procedure.

Columbia River Navigation

THERE is now before Congress a measure for which everyone interested in Pacific Coast development should be boosting 100 per cent. We refer to the bill for the amendment of the Inland Waterways Corporation Act permitting that corporation to operate on the Columbia-Willamette-Snake Rivers System just as it is doing on the Mississippi and Warrior Rivers Systems.

The Inland Waterways Corporation has been operating ten years on the upper Mississippi, lower Mississippi, and the Warrior, and during that time has handled a little less than 12 millon tons of revenue freight. It has been constantly improving the equipment and the service, and has recently been able to show a reasonable profit and at the same time save the shipper a considerable percentage over other available methods of transportation.

Extension of this service to the Columbia River system would be of great benefit to the producers of four western states and would open up tremendous future developments in agriculture, mineral wealth, and timber products. Incidentally it would bring much cargo to seaboard for transshipment. Urge it on your Congressman!

A. F. Haines

Recognized as an outstanding Pacific Coast Foreign Trade and Shipping Expert, A. F. Haines is vice-president and general manager of the Admiral-Oriental Line and President of the Pacific Foreign Trade Council.

Our California Nautical School

CALIFORNIA'S Nautical School is now ready for action and as we go to press, or more specifically beginning Thursday, January 29, 1931, some hundreds of young Californians at ten educational centers are in the throes of competitive examinations for the coveted prize of completing their education on the school ship. The young men who qualify will be among the best, since it is required that they be:

1. of good repute,
2. legal residents of the State of California and citizens of the United States,
3. not less than seventeen years of age,
4. sound in body and free from physical defects,
5. able to pass a competitive mental examination,
6. provided with entrance fee, not to exceed $150, and such items of clothing as may be prescribed,
7. enter the school voluntarily with a fixed and earnest purpose of completing the course, and becoming officers of the United States Merchant Marine.

The physical tests are very comprehensive and, if passed, would qualify the applicant for the very highest insurance rating. The mental examination, while not difficult, would require a thorough grounding in the subjects covered, such as simple mathematics, United States History, grammar and rhetoric, general information.

It is obvious that only those boys who are "of excellent character and rugged in physique" need apply with the hope of passing these tests. But even if these tests are passed there is the further barrier of adaptability to life on shipboard where each boy must prove himself "amenable to discipline and earnest in application with an honest and sincere purpose.—No applicant will be admitted to the school who, in the opinion of the board of governors, is unfitted for a life at sea; nor will any cadet be allowed to remain in the school unless he promptly, consistently, and willingly obeys all the rules and regulations for the government of the school and makes consistent and satisfactory progress in his studies and training." Since all work connected with the maintenance and operation of the ship both at sea and in port is to be performed by the cadets, it is plain that this two-year course will require lads of a resolute spirit who are willing to endure "hard and consistent mental and physical work" and the discomforts and privations incident to life at sea.

The Board of Governors of the California Nautical School are the type of men who will carry out the spirit and letter of these regulations, and we predict that the graduates of this school will be greatly in demand as officers in the American merchant marine.

A Tremendous Trade Opportunity

AMERICAN manufacturers and American farmers are looking for new customers. American ship operators are looking for more cargo. There is much surplus production and not a little surplus tonnage.

In a recent article (published in Nation's Business) by Victor M. Cutter, president of the United Fruit Company, greater development of trade with Latin America is indicated as the most economic solution of this problem.

This region, including Cuba, Mexico, and Central and South America, has a population of 85,000,000. Its land area is more than twice that of the United States; and only a little over one-half of this area has been even explored commercially. It is capable of supplying the entire world with food and possesses tremendous natural resources in oil, in minerals, and in timber, as well as tremendous present production in coffee, sugar, grain, hides, meats, and tropical fruits. The markets of this region are therefore ideally reciprocal. They need our manufactures and our capital for development. We need their raw materials and much of their developed product.

To quote Mr. Cutter further:

International Trade

"A little less than a quarter of a century ago the business done between the United States and Latin America totalled about 500 million dollars a year. In 1929 it was more than two billions of dollars; and this year, in spite of world-wide economic depression, it will be large. Yet it should be a great deal more. In the Caribbean countries, at least, we have reached less than 20 per cent. of the potential customers for American goods. In some industries the percentage is even less than that. We could be doing a business of ten billion dollars with Latin America instead of two billions.

Some time ago I made a casual list of opportunities in Latin America. It included power and light for a whole continent, the extension of railways and tramways, the building of highways, the development of agriculture—so far untouched on a large scale save in bananas, coffee, and sugar—particularly in cotton, tobacco, cocoa, fruits, wool, and rubber, mining, oil, merchandising, and banking.

It should be noted that this list is not the result of any survey or detailed study of the field. It is based more on the actual record of things the United Fruit Company has had to do to operate its railways and plantations which are essentially of a public nature—harbors, railways, hospitals, radio communications, bakeries, laundries, and modern sanitation programs. Over a 30-year period we have found this to be an excellent business investment, and we have never at any time expressed a wish to be relieved of it.

Today the opportunity is greater for the big corporations with adequate capital which can afford to invest for the long pull, but the openings for small businesses are increasing day by day.

Our country placed $42,419,960 in circulation in the Caribbean countries last year—$28,420,060 for payrolls and $13,999,900 for purchased fruit and sugar cane. Payrolls of other large American corporations are mounting annually. The customer is ready to be served."

Index for 1930

PACIFIC MARINE REVIEW Index for 1930 is now being prepared and will be ready for distribution by March 1, 1931. All those wishing copies of the INDEX for Vol. XXVII—1930—please send in requests prior to March 1.

Navigation on the Columbia River

Part II. Development of Commerce on the River Led to the Consolidation of the River Steamers and Later to Their Consolidation with the Railroad

By Charles F. A. Mann

THE consolidation of river steamers under the Oregon Steam Navigation Company in 1860 resulted almost immediately in higher rates for freight and passengers. Under this regime freight from Portland to Lewiston was $120 a ton.

Rates in 1854 had been as follows:

Portland—The Dalles, 110 miles—$15 per ton and $6 per passenger.

Portland—Umatilla, 200 miles—$45 per ton and $10 per passenger.

Portland—Walla Walla, 250 miles—$50 per ton and $12 per passenger.

Portland—Lewiston, 360 miles—$90 per ton and $22 per passenger.

At one time the fare to Lewiston was $80 per person. A typical instance was a shipment of 120 shovels for use in the mines. This shipment weighed about a third of a ton. The freight was $120, or $1 per shovel! However, by 1887 competition with other boats and the railroads had lowered the fares and it was possible to get to The Dalles for $5 each way.

Many famous steamers were built on the upper Columbia, and many famous individual exploits of skippers whose names are now forgotten form a part of the hectic history of that period. One of the most interesting was the Colonel Wright, already mentioned. She hauled supplies and men to Wallula then shipped by bateau to Ft. Walla Walla. Originally her builders, R. R. Thompson and E. F. Coe, made their money by hauling freight on flat bottom bateaus at $100 per ton, and invested their profits in the Colonel Wright, built at the mouth of the Deschutes River, above Cascades. They put her on the run from Celilo to Wallula hauling freight at $80 per ton, making three trips per week. When the O. S. N. was incorporated under the laws of Washington in 1866, the Colonel Wright and her owners joined that company and under Captain J. C. Ainsworth, its first president, began to make things hum on the river. Captain Coe purchased the first rails and locomotives for The Dalles-Celilo portage railroad in 1862, and the original Cascades Portage Railroad downstream. In 1862 the Tenino and Okanogan were built by the O. S. N. for use on the Lewiston run.

Through The Seven Devils Canyon

The most famous run of the early period of navigation was made on the Snake River from Boise to Lewiston through the treacherous Box Canyon of the Snake above Lewiston, when the O.S.N. steamer Shoshone was built to run between Olds Ferry and Boise. No steamer was ever built in the Northwest under more difficulties than the Shoshone. Hundreds of miles from the nearest sawmill or machine shop, her parts were assembled on the river at Boise at a cost sufficiently

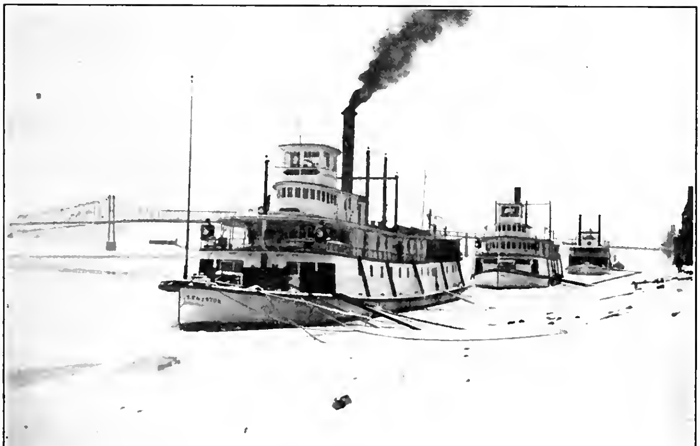
River front in Lewiston in 1905 with four grain boats tied up at the wheat warehouse and dock.

high to build three steamers like her on the lower river. She was finished in 1862 and her captain was Josiah Myrick. Failure of the run to the gold mines to materialize and discovery of a new and shorter route to the mines left the Shoshone a white elephant on the company's hands until 1870 when they finally decided to run her through the Seven Devils Canyon of the Snake, even at a risk of total loss, and find a place for her on the Columbia. In 1870 Captain Cy Smith was sent to bring her down. He succeeded in bringing her from Boise to Huntington, near the entrance of the canyon. She was refueled and started down to Lewiston. But Smith abandoned her at Lime Point in the canyon. Captain Sebastian Miller and Chief Engineer Buchanan were finally prevailed upon to risk bringing her down, a voyage which has never since been duplicated by any boat in either direction.

Captain Miller and his engineer journeyed by boat and horseback from Portland to Lime Point, taking 22 days for the journey. After a hurried tour of inspection they filled her with water to close her seams and when she was tight and ready started down. The wild 130 mile ride stove her bow in and they were three days getting to Lewiston. Part of her top hamper was knocked off and floated past Lewiston two days before the steamboat came in. Everyone gave her up for lost until she limped in amid wild cheers from citizens along the river bank. The channel was so narrow that its rocky walls scraped the deck house frequently as she shot the rapids. She made The Dalles and was used as a cattle boat above there until Captain Ainsworth took her over the rapids in 1873. She was wrecked on a small rock in the Willamette River in 1874, and her deck house ended its days in placid usefulness as a chicken house for a rancher near Salem.

Captain Miller was so successful in this exploit that the company sent him to Lake Pend Orielle to bring the steamboats Missoula and Cabinet over Cabinet Rapids, about 1874.

Two famous side wheelers were the crack boats of the Oregon Steam Navigation Company's fleet. First the Olympian, which was built in Delaware in 1883 and was operated on the lower river. She was 260 by 40 by 12.5 feet and was driven by 70x144-inch steam engines. Later she became part of the Oregon Washington Railroad & Navigation Company's fleet and was wrecked in Possession Bay in 1906. Second, the Alaskan of the O.W.R. & N. fleet, which was built in Dela-



Three grain boats of the Oregon Railway and Navigation Company frozen in the Snake River at Lewiston during the severe winter of 1900. (Right) Captain J. C. Aikens of the Lewiston which is still operating on the Snake River.

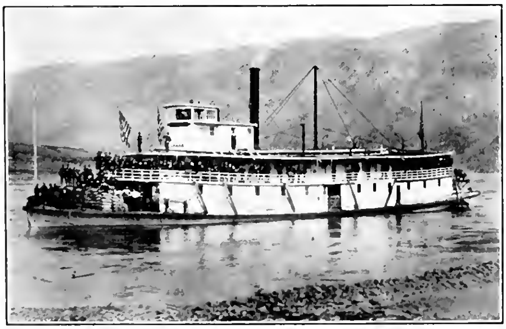
ware in 1888 and was of 280 by 45 by 12.5 feet dimensions and driven by 73x144-inch engines. She finally went up on Puget Sound, and ended her days at Cape Blanco in 1899.

The old Bailey Gatzert of the Columbia River and Puget Sound Navigation Company was built at Ballard, in 1890 and was a stern wheeler of 177.2 by 32.3 by 8 feet dimensions, and rebuilt in 1907 after many years on the Columbia as a passenger boat. She finally became part of the Puget Sound Navigation Company's fleet and is now used as a floating dock for the Foss Tug and Barge Company in Tacoma.

Out of the 300-odd ships built for Columbia River Service between 1850 and 1917, few are left. Only 23 were ever rebuilt after 1900 for lower Columbia River service.

The Cascade Locks were built around the Cascades in 1896, by the United States Government. The locks and 9-mile canal at The Dalles and Celilo, known as The Dalles-Celilo canal were opened in 1915. These two important links in the Columbia River channel will be discussed in future chapters of this article due to their important bearing on the future of upper Columbia navigation. Their link with the past lies in the fact that after sixty-five years of upper river navigation we find completion of locks that eliminated the two famed portage railroads; but they came at a time when it was too late to save the river boats as commercial links between Portland and the Columbia Basin country.

When the O.W.R. & N. absorbed The Dalles portage railway and made it a link in the main line from Ripraria to Portland, navigation on the Columbia above Celilo practically ceased. Only a few steamers remained on the upper river and these were taken to the Snake river to operate between its confluence with the Columbia at Pasco as feeders for the railroad, mainly hauling wheat. This fleet, four in number, remained as a part of river navigation at Lewiston until the railroad was opened to Lewiston, when it diminished to one lone survivor, the new freighter Lewiston, built in Portland and run up the river in 1923 by Captain S. V. Winslow, one of the two surviving pilots of the upper Columbia. The Lewiston was built after her predecessor ship of the same name, and her sister ship the Spokane were destroyed by fire in 1922 at their Lewiston pier. She is 160 feet in length, 35 feet beam and 5½ feet depth, and a sturdy freighter throughout. She transfers grain from one side of the river where rail facilities are not yet available and is in



Almota, built at Cecilo in 1876, was the largest freighter on the upper Columbia and cleared $14,000 on one trip during the Nez Perce war.

Steamer Lytton taking on cord wood for fuel on the upper Columbia in 1870.

command of Captain J. E. Aikens, veteran Snake River Pilot.

During the years 1891 and 1894 an attempt was made to revive navigation on the upper Columbia, when a portage railroad was built from Maryhill, Washington (then Columbus), to a point below The Dalles, before the Locks were opened by the government in 1896. The steamer Fred Billings was rebuilt at Pasco to run in connection with the railroad, but was wrecked on her first trip down. The company went into the hands of a receiver after the wreck, and nothing further was done toward navigating the river until the State Portage Railroad at The Dalles was opened in 1905. The Open River Transportation Company finished construction of two large river steamers in 1908 to run in connection with the railroad and these were operated between Celilo and Lewiston and Celilo and Priest Rapids on the Columbia until 1912, when service was suspended for lack of patronage. One steamer line operated until recently to Hood River on a daily schedule, hauling freight and passengers.

Thus 1912 ends a chapter in the history of the upper Columbia as a highway of commerce to and from the Columbia Basin country.

A Good Sea Yarn

OCEAN PARADE. By Fritjoff Michelson and Leon Byrne. Published by Robert M. McBride & Co., New York. Price $3. net.

A vivid, rip-snorting tale of a round voyage on a United States Shipping Board freighter from Portland, Oregon, to the Orient and return. The authors, two Pacific Coast newspaper men in search of adventure, shipped under false pretenses and found plenty of excitement. In fact, where ordinary excitement was not easily found they set their wits to work and manufactured some new variety thereof. They tell of their adventures in a rather novel fashion, each taking a chapter turnabout. Terse, vivid description of men, of nature, of ports, and of actions is the most outstanding characteristic of the book. Very readable, although in some quarters it will be considered that much of the text contains rather unjustifiable criticism of the American merchant marine and of Oriental port facilities. Indeed, if this book were a true picture of average conditions on American merchantmen and their contact with the Orient, then we would have small hope of operating in competition with our commercial rivals on the Pacific.

Practical Hull Design

Some Observations Based on Recent Papers Read Before American and British Technical Associations and on Recent Performance of Seagoing Vessels

THE primary object of operating merchant ships is to transport freight and passengers overseas economically. The merchant vessel is simply a link in a world-wide system of transportation. The ship's hull should always be designed with this primary object emphasized in the mind of the naval architect. The hull designed should be the one that can be built for the least possible capital outlay and yet most perfectly meet the economical requirements of the particular trade and route for which the vessel is intended.

For any special route or service the expert best qualified to specify the economical requirements would naturally be the old experienced ship operator on that route. He can best visualize and adapt both the data of past experience and the outlook for future expansion. When requirements have been so specified, these specifications should be turned over to a competent naval architect who will, after careful study and conference with the practical port engineers and port superintendents of the line, design the vessel that will most nearly meet the requirements of his client or employer and at the same time be a seaworthy craft, meeting all the governmental regulations for safety and for measurement and the requirements of the classification societies for structural strength.

This, as stated, would seem a comparatively simple problem. In reality it is one of the most complex and baffling of technical operations, and a satisfactory solution in each particular case is obtained only after a series of seemingly endless compromises.

In an excellent paper on "Ship Design from the Operator's Viewpoint," read at the last meeting of the Society of Naval Architects and Marine Engineers by William H. Ferguson, Carl E. Petersen, and Harry E. Stocker, the following are listed as the principal factors influencing ship design:

General Design Features

(a) **Capacity.**—Cargo-nature and quantity of cargo to be carried; whether or not any refrigeration is required for the preservation of cargo in transit; also whether or not any particular ventilation is required, and similar items.

Passengers—kind, class, and number of passengers to be carried, which in turn determine the accommodations and facilities to be provided.

Seasonal factor—whether or not the passengers and cargoes are subject to seasonal influences.

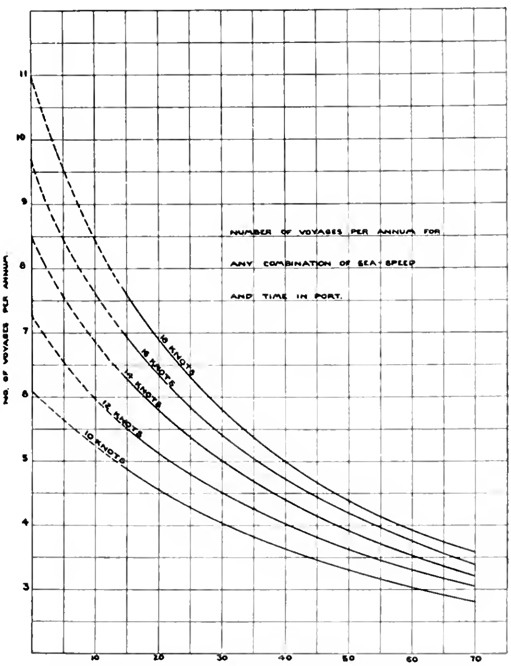
(b) **Speed.**—The economical speed is determined from a study of the factors, the distance between ports, the kind of cargoes and class of passengers (if any) that are carried, and also the competitive requirements of the trade.

(c) **Propulsion Machinery.**—The selection of the kind of propulsion machinery for any particular vessel depends upon a multitude of factors, principally those of reliability, service of vessel, power required, kind, availability, and cost of fuel, first and maintenance costs of installation, fuel economy, availability of skilled operating engineers, and similar factors.

(d) **Safety Requirements.**
(e) **Governmental Regulations.**
(f) **Classification.**
(g) **Deadweight and Cubic Capacity.**
(h) **Port and Terminal Facilities.**
(i) **Harbor Limitations.**
(j) **Mail Contracts.**
(k) **Competition.**
(l) **Economic Trends of Traffic.**

In this paper great emphasis is laid on the necessity of designing modern vessels for economical cargo handling, this stress being based on the fact that port charges are by far the largest single item in ship operation costs. Side ports, elevators, conveyors, and greater rope speed on winches were urged as means to this end.

The following points were brought out in discussion by various authorities. First, that the point of congestion in handling cargo, ship to pier, is usually at the point where the sling load is dropped on the



Number of voyages per year based on 10,000-ton deadweight vessel with an average voyage of 14,400 sea miles.

wharf. Second, that there is a safe rope speed for hoisting through a series of hatches and that this speed, established by long experience, can easily be exceeded by most steam or electric winches. Third, that side ports are much used in our coastwise vessels, but present some serious safety problems particularly when used on deepsea ships. Fourth, that there is a nice point in the economics of cargo handling as to the relative advantages of having the cargo handling machinery on the ship where it is idle a large part of the time or on the pier where it is constantly available and might spread its standing charges over a much larger volume of cargo.

The fact remains that "better and faster cargo handling facilities, properly used and supervised, result in greatly reduced costs" of operation, particularly when "port speed" of the ship is taken into account. The annual carrying capacity of a vessel is equal to the capacity of her holds multiplied by the number of round voyages per year. In designing a vessel, both of these items are variable. Increased annual carrying capacity may be obtained in any one of three ways or in combination of these three methods.

First, Increasing size of vessel.

Second, Increasing speed of vessel at sea.

Third, Increasing speed of vessel in port.

The paper in review shows that of the three methods, the third is usually the most economical. Increasing the sea speed of a 10,000-ton deadweight freighter on a 14,000-mile voyage from 12 knots to 16 knots, as shown in the table herewith, greatly reduces the owner's net returns on his investment. Keeping sea speed at 12 knots and increasing port speed 30 per cent., which in many cases would be quite possible, gives the same number of round voyages per annum as would be obtained by increasing the sea speed to 16 knots and nearly doubles the net profit.

These figures make very clear the advisability of designing ships (and terminals) for greater "port speed." It is also clear that the shipowner can get the most economical combination only after a thorough analysis of all the factors involved in his particular trade route. On the route of any vessel there are miscellaneous port conditions over which the owner has no control, and allowance for these must be made in figuring port speed. The paper calls attention to cargo handling as a new "engineering field" and to the opportunities that lie therein for the marine mechanical engineer.

TABLE 2.—PER ANNUM EXPENSES AND REVENUES

10,000-ton deadweight cargo vessels, single screw, 26' draft

	Voyages per annum
(A) 12-knot ship, first cost $1,500,000	4.03
(B) 16-knot ship, first cost 1,920,000	4.70

Basis used 40 days in port per voyage

Expense item		Ship "A" Dollars per annum	%	Ship "B" Dollars per annum	%
Fixed Charges. (10% of ship cost)	Depreciation at 3% Insurance at 4½ Taxes at ¼ 3% interest on ¾ of ship cost (2¼)	$150,000	26	$192,000	27
Semi-Fixed Expenses per annum.	Pier rentals	25,000	32	25,000	29
	Wages (crew and officers)	50,000		52,000	
	Food and stores	25,000		26,000	
	Administration and overhead expense	40,000		42,000	
	Maintenance and repairs	45,000		58,000	
Variable Expenses. (b) Varies with number of voyages	(a) Fuel (approximate, see Table 3 below)	40,000	42	80,000	44
	(b) Cargo handling	130,000		150,000	
	Cargo insurance	10,000		15,000	
	Port dues, Canal tolls	40,000		47,000	
	Pilotage and towage, Commissions and brokerage	25,000		30,000	
	Total Expenses	$580,000	100	$717,000	100
Based on number of voyages at $160,000 per voyage	Total Revenues	644,800		752,000	
	Net Profit	$64,800		$35,000	
(a) Per cent return on owner's investment		12.92%		5.83%	
(b) Per cent return on cost of ship (including *all* interest on money invested)		6.57%		4.07%	
Approximate investment by Owner ¼ cost of vessel plus working capital (Add ⅓ more to owner's investment for working capital)		$500,000		$600,000	

Comparison of expenses and revenues possible with a 10,000-ton deadweight single screw vessel.

Some Ship Shape Considerations

E. M. Bragg, professor of Naval Architecture and Marine Engineering at the University of Michigan, brought to the meeting of the Society of Naval Architects and Marine Engineers the "Results of Experiments upon Bulbous Bows", a paper dealing with some model towing tests done at the University of Michigan naval tank for the United States Shipping Board under the direction of Admiral D. W. Taylor. Professor Bragg says of these experimental results that they do not simplify but rather complicate the problem of "selecting the proper from of hull for a given set of conditions." Apparently, judging from the text and the discussion of this paper, the models were not self-propelled but towed. We understand that the German experiments on self-propelled models at the Hamburg tank developed the result that much of the value of the bulbous bow lay in its alteration of the wave formation caused by the propulsion of the hull so as to bring about a favorable position of the wave with regard to the propeller.

Discussion brought out the fact that the bulbous bow was proving itself objectionable in turbulent water and that Maierform might produce better all-around results.

Merchant ship designers are constantly meeting new problems in materials, in stresses, and in propulsion. The formulas on which designs are based require much judgment in application to any given hull. Judgment can only be acquired by long experience. Many expedients in general use are fairly open to question. For instance, it has been quite general practice on large vessels with high superstructures to incorporate so-called expansion joints with the idea of relieving the superstructure from excessive strain. Certain recent investigations tend to show that such joints introduce excessive localization of stresses in the main hull structure. Witness the recent troubles along this line in both the Majestic and the Leviathan.

To-day in Great Britain, in France, and in the United States, ship operators, aided by their respective governments, are ready to build passenger liners much larger than the Leviathan and to power these vessels for operation at much greater sea speeds. Into these hulls undoubtedly will be built all the experience gained from the operation of former merchant and naval ships; and we shall soon see great progress in hull design exemplified in many fine new passenger liners. Italy also is in the race for the transatlantic blue ribbon with a steam liner of 45,000 gross tons to travel 28½ knots. In at least one announced detail this vessel will be in advance of the others. She is to be equipped with gyroscopic stabilizers—three of them, weighing 100 tons each. Mussolini is a great advocate of stabilization.

Meantime, let us not forget that the economics of merchant shipping is concerned more with the thousands of slow and medium speed cargo and combination vessels than with the half dozen giant speed burning liners only justifiable as publicity stunts on the North Atlantic Ferry. A comprehensive engineering investigation of all the problems involved in the design of merchant shipping of this character should be the primary objective of all naval architects and shipowners. To this end the United States should increase her capacity in hydraulic laboratories and model testing tanks and should adequately equip such institutions to carry on theoretical scientific analysis of all factors in ship design and propulsion.

While naval architects generally recognize the value of model test data, there is considerable feeling being expressed that the data made public are rather fragmentary. This leads John de Meo of New York to suggest (in Shipbuilding and Shipping Record) the formation of a "Technical Marine Association" of an international character for the special purpose of "accumulating research data, of reducing such data to a common denominator, of arriving at reasoned decisions as to the adequacy of the accepted propulsion theory, and of planning future research along lines having a definite practical object.

"In the meantime and in fact until some such organization is actually in being, it seems desirable that progressive naval architects, marine engineers, and designers intimately concerned with ship propulsion problems in the principal maritime countries should leave on one side useless consideration of model-screw data, with their accompanying requirements of intricate mathematical investigations upon hypotheses which lack complete confirmation, and rather confine their efforts to practical research in open water and possibly upon actual ships."

Practical research of this character is, of course, a more or less continuous process; and it seems to us that a technical marine association devoted to gathering and correlating the results of such practical research is more necessary and would be of more value than one devoted to the results of scientific research at the hydraulic laboratories. The results of practical sea experience, when they have served the particular object of the engineer, naval architect, or shipowner who is carrying on the experiments, are very apt to be lost in some private file or waste basket. Much duplication of work and an enormous amount of mental strain might be eliminated if the practical findings of practical observers at sea were accumulated, correlated, and indexed in form readily available to the shipowner, naval architect, and marine engineer.

We recall that a very great citizen of the United States, one Matthew Fontaine Maury, did a splendid service for the maritime world in the middle of the last century when he instituted a system for gathering from the logs of sailing ships the facts about ocean winds and currents. That service, which cost the shipowners involved practically nothing, kept the operating personnel keyed up to a high level of efficiency and enabled all ship operators to save much time and money.

A similar world-wide service on the performance of power vessels might produce information that would greatly simplify some of the problems of the hull and machinery designers and would have a tendency to greatly enhance the efficiency of seagoing personnel. Such a service would be easily possible through the cooperation of shipowners and an international technical marine association. An association of this type might well take the form of a naval architectural council formed by qualified experts delegated from the world's societies of naval architecture and marine engineering, with suitable technical committees to cover the various detail factors of modern hull design and propulsion.

Maritime Legislation at Washington

SINCE the convening of the present session of Congress, December 1, a number of new bills affecting maritime interests have been introduced in both the House and Senate. It is doubtful, however, whether any action will be taken on them at this session. Three of these were introduced by Representative Wallace H. White, Jr., of Maine. One of them (H.R. 14269) would permit the Shipping Board to increase the amount it may now set aside for the construction loan fund from the revenues of sales and proceeds of securities taken as evidences of debt from $125,000,000 to $250,000,000.

The other two bills are each designed to accomplish the same purpose, namely, remove from the statute books a "rider" placed in a recent appropriation bill which apparently restricts the Shipping Board in making loans from the revolving fund. These bills are H.R. 14583 and 14584.

Representative Albert Johnson of Washington introduced a bill (H.R. 15429) to create a board of local inspectors of the Steamboat Inspection Service at Tacoma, Washington.

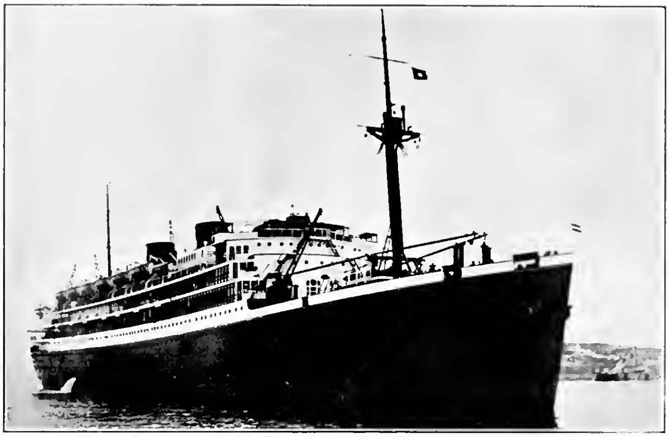
Felix Cordova Davila, one of the delegates from the Philippines, introduced a bill (H.R. 14050) empowering consular officers at foreign ports to inspect vessels bound for the United States to prevent the spread of contagious diseases.

A bill (H.R. 14074) to require vessels carrying 50 or more persons to carry "efficient apparatus for radio communication" before leaving any port in the Canal Zone, was introduced by Representative Edward E. Denison of Illinois.

Senator Reed Smoot of Utah introduced a bill (S. 5380) which would prohibit any line operating under an ocean mail contract from engaging in coastwise trade. Mr. Smoot said that it was his earnest hope that legislation of the kind would not be required, but that he was introducing the bill because of the possibility that it would be necessary to prevent unfair competition between lines which have mail contracts and other coastal lines which do not have them.

Senator Wesley L. Jones of Washington has reintroduced his bill exempting from income taxes money received in settlement of awards made by the Mixed Claims Commission, United States and Germany. This money would only be exempt, however, if it was set aside in a trust fund for building ships.

Prospects for legislation proposing to tighten the immigration laws to stop the infiltration of alien seamen into the United States do not seem particularly bright at this time, nor is it likely that any law of this sort will be enacted at the present session of Congress. There is only one measure of importance now pending before Congress which seeks to accomplish this end, and this bill, sponsored by Senator William H. King of Utah has been in the limelight for some years. During its career on Capitol Hill it has passed the Senate at least twice, the last time on April 14, 1930. It has been held up, however, pending disposition of a motion to reconsider made by Senator Arthur R. Gould of Maine, chairman of the Senate Immigation Committee, which favorably reported the bill to the Senate. Until this motion to reconsider is acted upon, the bill will lie dormant, so far as the Senate is concerned. There is a similar bill pending before the House Committee on Immigration and Naturalization.



The Dutch motor line Johan van Oldenbarnevelt is equipped with Sulzer engines.

The Marine Diesel Situation

Oil and Gas Power Division of the American Society of Mechanical Engineers Reports Progress During 1930

FROM a world standpoint, the marine diesel situation has never been better. World tonnage under construction at the end of June, 1930, was 1,117,624 steam and 1,920,505 diesel-powered vessels—a decrease in steam tonnage from last year and an increase in diesel tonnage. The figures are more striking if taken for one size range, that from 6000 to 15,000 tons. Here we find 160 motorships under construction as compared to only 39 steamships.

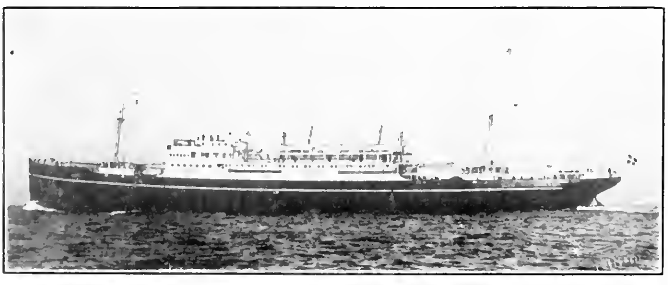
The Britannic, the world's second largest motorship, announced in last year's report, went into service in May, 1930, and has since shown a highly satisfactory performance. It is worth while repeating that this ship is propelled by two Harland-Burmeister & Wain 4-stroke, double-acting, air-injection engines of 10,000 shaft horsepower each. The largest French motorship, next to the Britannic in the world line-up, the Lafayette, with 18,000 shaft horsepower on four shafts, made her maiden voyage from Le Havre to New York in May, 1930. The main propulsion units in this ship are M.A.N. engines of the double-acting, 2-stroke, air-injection type. These two large diesel ships bring the total of passenger motor vessels of 20,000 gross tons and over to nine.

The motorship Amerika, the first vessel to have Burmeister & Wain, double-acting, 2-stroke, mechanical-injection engines, has completed two long voyages, one to the Far East and one to the west coast of the United States. These engines are reported to have shown an overall fuel consumption of 0.365 pound per brake horsepower hour, thus setting a new mark for motorships.

The gear-drive motorships St. Louis and Milwaukee, also referred to in last year's report, have so operated as to call attention to the merits of this method of connecting diesel engines to propellers. The combined weight of engines and gearing is said to be but 125 pounds per shaft horsepower.

Another famous gear-drive installation—that on the German cruiser Ersatz Preussen—once reported to total only 17 pounds per shaft horsepower, has since been more reliably announced to weigh 50 pounds per shaft horsepower—still a very remarkable figure.

The Sulzer-engined Asama Maru, in service since



Ms. Amerika, first vessel fitted with Burmeister and Wain double-acting, 2-cycle engines, set an overall fuel consumption of 0.365 pound per brake horsepower.

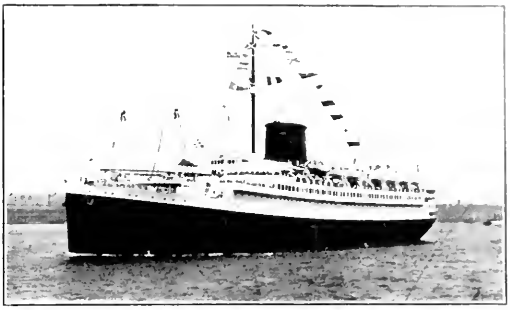
the beginning of the year, established a new record on her fourth run between Yokohama and San Francisco, and is now the fastest motorship on the Pacific. The Tatsuta Maru, built several months later, has exactly similar Sulzer-design machinery constructed at the Mitsubishi shipyard. Sulzer Brothers report that there are now over 3,500,000 horsepower of Sulzer-system engines in service and under construction.

The motor-passenger-ship status can be illustrated by citing the figure of 58 motor passenger liners of 9000 tons (gross) and over—or a total of 855,000 tons (gross)—in service at the end of June, 1930, with 24 passenger ships of this size range on order, aggregating 335,000 tons (gross).

The marine situation in the United States does not show anything like the variety and progress of that of Europe. In the list of motorships of all classes between 6000 and 15,000 tons under construction on June 30, the United States has only three as against 160 for the world. The immediate reason for this situation is partly to be found in the present unfavorable price differential between boiler oil and diesel oil in the eastern seaboard ports. Another factor in the situation is the unwillingness of ship owners on the one hand to order engines of sizes hitherto undeveloped, and the natural reluctance of diesel builders on the other to bring out new and larger sizes without some assurances of a continuing market. In Europe what almost amounts to a quantity-production system is made possible by the numerous building programs of standard ships. During the year a move toward ship standardization has been made by the National Council of American Shipbuilders. It is too early to say what the result of this will be. Should it be successful, however, the diesel program would benefit greatly.

The Jones-White shipping subsidy has been disappointing from a diesel standpoint. Only one motorship—the City of New York—has been built under its provisions. The assumption is not made here that all ships should be motorships. Experience has shown that a careful study of individual trade routes should be made before determining what type of power should be used. However, in the opinion of eminent American ship operators, Jones-White grants have been made for steamships to operate on long trade routes where motorships would be far more economical and successful in competition with foreign-flag motorships. The responsibility lies with the operators, as the Shipping Board has no authority to do more than assure itself that a "modern" power plant is used.

The new motor liner Winchester Castle of the Union Castle Line operates between Southampton and South Africa.



C.G.T. new motor liner Lafayette for the transatlantic service.

It has been reported that the next naval appropriation bill will request $3,000,000 for the development of diesels for scout cruisers. This is no doubt an outgrowth of the world-wide interest in the Ersatz Preussen and the three German cruisers with cruising diesels.

It is not generally known that one domestic shipyard—the Sun Shipbuilding & Dry Dock Company of Chester, Pennsylvania—has launched during the past year seven motor tankers of 13,500 tons deadweight each, and one combination freight and passenger liner (the City of New York) of 10,000 tons deadweight. Each of these tankers has one engine of 2800 shaft horsepower. The freighter-passenger ship has two engines of 2700 shaft horsepower each. The aggregate horsepower of the eight ships was 26,000 and the tonnage 104,500 deadweight capacity. This plant has now on order nine more motor tankers aggregating 25,200 shaft horsepower and 121,500 tons deadweight capacity. All ships have been and will be powered with Sun-Doxford, opposed-piston, 2-stroke, mechanical-injection engines.

It is significant that the Sun company is the only American shipbuilder operating an engine plant, or —if preferred—the only American diesel-engine manufacturer also operating a shipyard.

The Pusey & Jones shipyard at Wilmington completed four large yachts last fall with main power plants aggregating 7600 shaft horsepower and later secured the contract for four large diesel-electric tugs aggregating 4000 shaft horsepower.

The world's largest towboat is being built at Dubuque, Iowa, for the use of the Inland Waterways Corporation. It will have two 1100-horsepower McIntosh & Seymour engines on twin screws.

Completion of six diesel-electric lightships, each of 350 shaft horsepower, marked the entry of the Bureau of Lighthouses into the diesel market.

The construction of steel trawlers for the Atlantic coast—a good business a year ago—has suffered a falling off. However, the Pacific Coast fishing program is calling for bigger and faster boats because of the fact that tuna fishermen must go farther out than formerly to secure a good catch. A few years ago a 70-foot boat holding 40 tons of fish and with a 100-horsepower engine was considered a good-sized boat. Last year quite a number of boats have been built from 100 to 125 feet in length, with 150 tons fish capacity and with 500-horsepower engines. One correspondent states that next year he expects to see 200-ton boats with 1000-horsepower engines.

Engines and Engine Design

Weight reduction is the present-day aim of engine designers. To this end speeds are being increased. Whereas piston speeds of around 900 feet per minute were once the rule for heavy-duty units, now standard practice is approaching 1200 feet per minute. Increased knowledge in the construction and operation of engines, improvements in combustion arrangements, and new alloys and steels are making this development possible. Deutz, for instance, call our attention to the fact that it manufactures 1000-horsepower engines to turn at 375 revolutions per minute.

At the Marine Show in New York last winter, twelve firms exhibited marine diesel engines. All were mechanical-injection, many were rated between 600 and 1000 revolutions per minute, and weights ran as low as 13 pounds per brake horsepower in one instance, with several in the 30-pound class. Two of the exhibited models were of V-construction—the Treiber and Winton. The former is a 12-cylinder engine rating 300 horsepower at 1000 revolutions per minute and weighing but 3800 pounds; the latter is a 16-cylinder unit rating 650 horsepower at 750 revolutions per minute and weighing 18,500 pounds.

In this country the trend toward lighter weight is progressing chiefly in the small- and medium-size engine field. Mechanical injection is playing a part here, and there is a tendency here as in Europe to pass more and more to this type of injection as opposed to air injection.

There has been a tendency to turn the design and construction of the mechanical-injection fuel pump over to specialists in that field—such as Bosch, Deckel, and R.E.F. One of these announces that he is prepared to take care of the fuel-injection requirements of the largest diesel built at the present time.

The use of aluminum and aluminum alloys has become so commonplace that most correspondents neglect to mention it. However, the nitriding of steel is to the fore, and many consider it the most important metallurgical development of the past several years from the diesel standpoint. It seems to quite overshadow chromium plating—once regarded as highly significant. The nitriding process is considered chiefly for pistons, rings, liners, crankshafts, and injection-pump parts.

The United States Navy Yard, New York, can now cast cylinder liners up to 24 inches by a centrifugal process, and finds that it is possible to increase tensile strength and hardness without increasing machining difficulties. This yard also reports that corrosion and heat-resisting steels for valves result in many more hours between grindings.

Burmeister & Wain favor "Perlit" for the castings exposed to heat. Great experience is necessary, they say, to make big castings of this material, but when successful, "Perlit" castings are more resistant against heat stresses and wear.

Dr. Sass reports that he has adapted a process for making engine parts subjected to heat and pressure stresses partly of cast steel and partly of wrought iron, these two materials being copper-soldered in an atmosphere of hydrogen.

The largest domestic builder of diesels, Fairbanks, Morse & Co., brought out a new line of direct-mechanical-injection engines during the year. These engines have separate scavenging pumps instead of the familiar crankcase compression of previous models. The result of the improved combustion system has been an appreciable reduction in fuel consumption.

The oldest domestic diesel manufacturer, Busch-Sulzer Bros.-Diesel Engine Co., has announced the acquisition of a license under the patents of the A.E.G., of Germany, and K. J. E. Hesselman, of Sweden, and also arrangements for technical cooperation with these firms—including the well-known Dr. Sass—that will enable them to build large and small mechanical-injection engines, as well as double acting engines. The company plans to combine the best that these arrangements can afford with the best Busch-Sulzer constructions.

Abroad we find the same tendency toward higher speeds and similar metallurgical refinements. Mechanical injection is gaining ground not only for small- and medium-sized engines but for large engines as well. The goal of less weight and space for more power is being sought by two roads—one is the use of pressure charging for 4-stroke machinery; the other is the employment of 2-stroke machinery. Both schools are resorting to double-acting engines more and more.

Pressure charging of European marine engines is no longer a theory but an every-day occurrence. There are several well-defined methods—the Buchi, the Werkspoor, the Lorenzen, and the Rateau; these employ exhaust-gas turbo-blowers, except the Werkspoor, which uses the under sides of the pistons as compressors. Practically all are agreed that engines can be designed for pressure charging with a 40 per cent. increase in horsepower per given unit of cylinder volume—some claim 50 per cent. increase. Among the numerous instances of pressure-charged engines the order of the Anglo-Saxon Petroleum Corporation for 18 tankers, each to have Werkspoor-system supercharged engines, is noteworthy. The Werkspoor Company has 80,000 horsepower under construction with the Werkspoor pressure-charging system.

Along with pressure charging, exhaust-heat recovery is becoming characteristic of European marine practice. The Britannic, for instance, has four exhaust-gas boilers for 100 pounds steam pressure, with an approximate generating capacity of 10,000 pounds of steam per hour.

The healthy European marine situation is the motivation behind the pressure-charging progress and the 2-cycle, double acting program. The logical outgrowth is the tendency of European builders to develop larger and larger sizes. The Hamburg 15,000-horsepower M.A.N. engine has long stood out as the largest diesel in the world. However, at least two builders announce that they are ready to construct larger engines. Burmeister & Wain are prepared to undertake the construction of 2-stroke double-acting engines, similar to the design of the Amerika engines, as large as 12,500 kilowatt for stationary plants. Sulzer Brothers are also branching out into larger sizes and state that they are prepared to offer 2-stroke, double-acting engines for land or marine use up to about 20,000 to 25,000 horsepower per unit. They are now building a double-acting engine of 7000 horsepower for a Dutch motorship, and an 11,000-horsepower engine for an electric power plant. What the weights of these units will be is not stated. However, Sulzer's single-acting, cross-head design, made up to about 3000 horsepower, weighs less than 60 kg. (130 pounds) per brake horsepower. Sulzers are also manufacturing mechanical-injection engines of 4-stroke design.

Modern Geared Marine Turbines

By C. R. Waller*

Chief Engineer, De Laval Steam Turbine Co.

THE steam turbine has been developed for land power plant service to a high degree of perfection. Most of the land power plant practice has been applied for use on ships, but the fact still holds that the geared turbine to propel a ship must be designed to meet all the requirements peculiar to this class of service. The problem of driving a propeller in a ship that is being tossed about on the high seas is a different problem from driving a generator or pump installed on a permanent and solid foundation.

Outstanding general requirements which must be considered when a turbine is to be applied to ship propulsion are:

1. Operation in either direction of rotation.
2. Efficient transmission of power from high speed turbine to low speed propeller.
3. Ready installation on the ship's structure.
4. Reliability of service.
5. Simplicity of operation and maintenance.
6. Efficiency in performing the work.

Standardization

There has never been any attempt to standardize sizes of propelling units in the same manner as has been done with generating units. The specifications issued for a new ship contains pages of definite requirements covering the construction of the hull and its subdivisions; but usually only a relatively small part is devoted to the propulsion machinery. Quite recently the author read an inquiry from a shipyard calling for a price on a complete propelling unit of 6000 shaft horsepower. The unit was to be built as per specifications attached (the specifications referred to covered less than one-half a typewritten page.)

The author has prepared a set of specifications based on present-day practice and will present a line of machines of a uniform design to meet these specifications, in the hope they will be used as a basis for a discussion emphasizing such outstanding details as should rightly belong in typical specifications fully protecting the shipowner and in the desire to assist the shipbuilder and the manufacturer when preparing their estimates.

These specifications cover marine turbines with double reduction gearing, but are equally applicable if compound turbines are used with single reduction gearing or triple turbines with one single gear reduction.

When using single reduction gearing with two or three pinions, it is always necessary to go to extremely large gears in order to maintain as good a ratio as possible between the turbine speed and propeller speed. For propeller speeds below 150 revolutions per minute it has been found that the three turbine arrangement, single gear construction, costs appreciably more than the compound turbine with double reduction gearing, the weight being in favor of the double reduction gearing and the economy is practically equal. If compound turbines with single gear reductions are considered, the weight and price would be nearly the same as the compound turbine with double gear reduction, but the economy would be about 3 to 4 per cent. in favor of the compound turbine with double gear reduction.

The only case where single gears should be considered is in connection with specially designed ships having high propeller speed and where the steam conditions may be more favorable to lower turbine speeds.

Another difficulty in connection with the single gear reduction is the location of the main thrust bearing. This should preferably be built in the gear casing at the forward end, an arrangement, however, which is not always permissible due to interference with the turbine casings or the condenser equipment, particularly if the condenser is placed below the low-pressure turbine.

This suggested line of geared marine turbines covers units in sufficient number to take care of any requirement where the output falls within the range of 3500 to 15,000 shaft horsepower with propeller speed of 75 to 125 revolutions per minute. Each unit in the list must be designed to meet the specifications and requirements set forth and should at the same time represent a design embodying the maximum commercial economy with best present-day practice.

Specifications and Requirements for Double Geared Compound Turbine Propulsion Unit

1. The propulsion unit shall be of the impulse type, rugged, and of liberal construction throughout, arranged so as to be easily disassembled for inspection or repairs, and so constructed that all parts subject to wear are interchangeable and can be replaced without fitting.

2. Each propelling unit shall consist of:
   (a) One low-speed gear reduction.
   (b) Two high-speed gear reductions entirely independent of the low-speed reduction.
   (c) One high-pressure turbine and one low-pressure turbine supported from and attached to the high-speed reductions.
   (d) Connecting piping between high-pressure and low-pressure turbine, including expansion joints.
   (e) All pipes and fittings for oiling system on the unit proper.
   (f) One main thrust bearing located forward of the slow-speed reduction.

3. The turbine and gears shall be arranged in relation to each other so as to allow the installation of a condenser below the low-pressure turbine.

The ideal location of a condenser is as near to

*Abstract of paper read before the Thirty-Eighth General meeting of The Society of Naval Architects and Marine Engineers in New York, November 13, 1920.

Turbine frame	Rating in S.H.P. slow speed coupling	R.P.M. high pressure turbine	R.P.M. low pressure turbine	R.P.M. propeller
A	3500	5600	4250	75
B	5000	5200	3750	80
C	7500	4700	3340	90
D	10000	4200	3000	95
E	15000	3750	2600	100

FIG 1 DESIGNED RATING AND SPEED

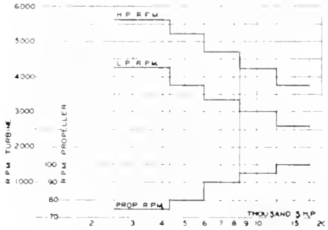


FIG 2 POWER & SPEED RANGE OF TURBINE FRAMES

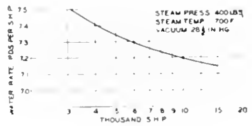


FIG 3 EXPECTED WATER RATES

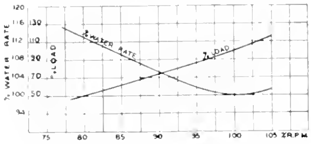


FIG 4 CHANGE IN WATER RATE & LOAD DUE TO CHANGE IN SPEED

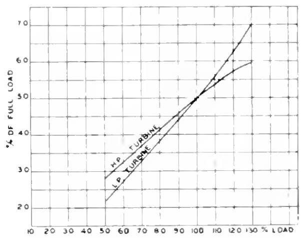
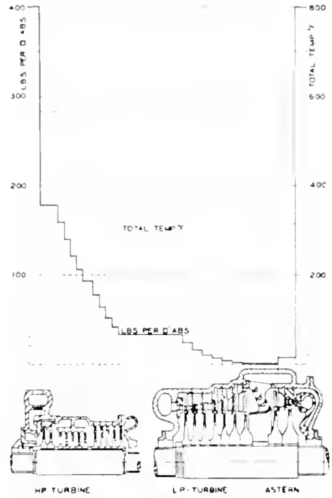


FIG 5 LOAD DISTRIBUTION BETWEEN HIGH & LOW PRESSURE TURBINES



PRESSURE & TEMPERATURE CONDITION AT NORMAL RATED LOAD

Characteristics of proposed standard marine geared turbines.

the last turbine wheel as practical in order to give the shortest passage for the exhaust steam from the last wheel to the condenser tubes. The old arrangement of top exhaust with the condenser placed near the hull of the ship requires a large cumbersome exhaust connection to convey the steam from the turbine to the condenser. The loss of vacuum in this overhead exhaust system is in itself sufficient to warrant its elimination. The average loss will be as high as ¼-inch vacuum, which represents a direct loss in economy of 1.8 per cent. Expressed in fuel, this would amount to approximately five barrels of oil every twenty-four hours for a ship wtih a 6000-horsepower propelling unit.

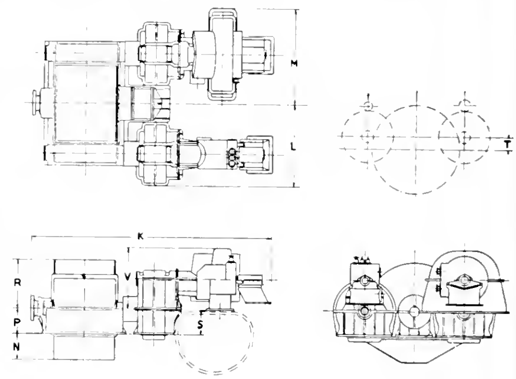
The placing of the condenser below the low-pressure turbine gives a direct drainage from the turbine casings to the condenser and eliminates any accumulation of water in the casings or piping system between the high and low-pressure turbines.

4. A Kingsbury type of main thrust bearing shall be provided forward of the low-speed gear reduction. When operating under normal rated condition, the estimated thrust of this bearing shall not exceed 300 pounds per square inch of thrust shoe area.

The placing of the main Kingsbury thrust bearing forward of the gear reduction is an important detail. When designing a ship's structure to take care of the thrust, it is always preferable to have the structure transmitting the thrust from the bearing to the hull in compression rather than to have these members in tension. The thrust bearing housing may be cast integral with the slow-speed reduction but may also be a separate housing. In either case it can be given a correct support without structural difficulties.

5. A reversing turbine shall be fitted in the low-pressure casing and must develop not less than 80 per cent. of the normal ahead torque at 50 per cent. of the normal speed, with normal rated ahead steam flow.

Referring to the torque needed for the reversing turbine, the subject is practically always discussed each time a new vessel is planned. With the old type of reciprocating engine, it was not necessary to give any particular thought to reversing torque available, as the engine would in most cases give as much



FRAME	DIMENSIONS									APPROX WEIGHT RATIO %
	K	L	M	N	P	R	S*	T**	V	
A	21'-8"	9'-0"	9-11"	3-1"	3-0"	5-10"	3-5"	2-6"	5-3"	100%
B	23-2"	9-4"	10'-8"	3-1	3'-0	5-10"	3-2"	3-0"	6-1"	120%
C	25'-7"	9-5"	11-2"	3-1"	3-0"	5'-10"	3-0"	2'-8"	6-7"	140%
D	29-3"	9-10"	11'-7"	3-1	3-0"	5-10	2'-11"	1'-6"	7'-4"	170%
E	32'-7"	10-5"	13'-0"	3-3"	3'-4"	6'-4"	3'-1"	2'-3"	7-11"	200%

* DIMENSIONS - S - BASED ON LOW SPEED PINIONS ON SAME PLANE AS MAIN GEAR SHAFT

** DIMENSIONS - T - INDICATES MAXIMUM PERMISSIBLE ELEVATION OF LOW SPEED PINIONS ABOVE MAIN GEAR SHAFT

Approximate dimensions of proposed standard turbines and gears.

torque reversing as it would ahead. In the case of the steam turbine, however, the reversing turbine is added equipment, and as this added equipment is only to be used for maneuvering purposes, it is important that it be made sufficient for that service only, thus reducing its size and consequently its cost. The reversing characteristics of the propeller have also an important bearing upon the reversing torque that can be utilized.

A number of marine equipments have been built under the author's supervision where reversing power has been provided as per item 5, and in no case has there been any complaint of the ship not being provided with sufficient reversing power.

Steam Conditions

6. Steam pressure at the turbine throttle, 400 pounds square inches absolute. Total steam pressure at the turbine throttle, 700 degrees Fahrenheit. Vacuum at the turbine exhaust, 1½ inches mercury absolute.

The above steam conditions represent pressure and temperature that have been considered during the past twelve months. It was deemed advisable to select the steam condition high enough to cover practically any condition that may be considered in connection with any standard ship. Four hundred pounds pressure with 700 degrees temperature constitute to-day conditions that can be met with a standard boiler construction and standard valve and pipe designs.

Rating

7. The normal rating shall be the shaft horsepower for which maximum efficiency is expected when operating the ship at the designed speed.

8. The maximum shaft horsepower will be 20 per cent. in excess of normal rating.

By specifying a maximum operating power the builder of the propelling unit is forced to provide a turbine with sufficient nozzle capacity and also proportion his gears for the larger horsepowers, thus insuring to the owners that the ship can be operated at the additional power wherever the occasion arises.

9. The best water rate must exist at the normal rating.

The water rate will refer only to the amount of steam used per shaft horsepower of the main propelling unit, the power being measured at the slow speed coupling of the gear reduction.

10. The water rate curve must be as flat as practical between 80 per cent. of the rated load and 120 per cent. of rated load with not over 4 per cent. increase for the 80 per cent. point.

Turbine Construction

11. The high-pressure turbine case complete with steam chest and valves shall be of cast steel. The low-pressure turbine case shall be of high grade cast iron or semi-steel. The steam chest for the reversing turbine shall be of cast steel.

Turbine casings must be designed so as to permit bleeding steam for feed water heating.

12. All turbine casings are to be hydraulically tested for not less than 1½ times the maximum working pressure in the casing. All valves, fittings and steam chests coming in contact with high-pressure steam to be hydraulically tested at 800 pounds per square inch.

13. The turbine rotors shall be so proportioned that the critical speed of the rotors shall not be less than 40 per cent. above the speed for normal rating.

14 The turbine rotors must be tested in the maker's shop and operated at 15 per cent. above the speed required for normal rating, and at such speeds the stresses in discs and buckets shall not exceed one-quarter of the elastic limit of the material used.

15. The material for revolving buckets shall preferably be made of monel metal or 5 per cent. nickel steel. All stationary vanes, guide buckets and nozzles shall be made of noncorrosive material.

16. All diaphragms for the high-pressure turbine shall be of steel and may be solid or split. All diaphragms for the low-pressure turbine shall be of semi-steel. All diaphragms that are split must be of such construction that the upper halves of the diaphragms will remain intact with the lower halves of the diaphragms when the cover is lifted.

17. Turbine bearings supporting the weight of the rotors must be proportioned to have not more than 50 pounds pressure per square inch projected area.

18. If the Kingsbury type of thrust bearings are used for the main turbine thrust, such bearings must be proportioned not to cause thrust load in excess of 200 pounds per square inch of thrust shoe area when operating at maximum power.

It has been considered very important that some definite limitations be specified as a guide to the designer and as an added safeguard to the owner. Undoubtedly, the troubles that were experienced with geared marine turbines built some ten or fifteen years ago were primarily due to the fact that designs were not conservative enough to take care of the more or less abnormal condition that sometimes takes place on board a ship.

Paragraph 16 also calls for the diaphragms of the low-pressure turbine to remain with the lower halves at the time the cover is removed. This stipulation was added to facilitate handling the turbine case cover. If the turbine is open for inspection or cleaning, it becomes a problem to handle the large low-pressure turbine case cover when all the diaphragms are attached to this cover. Where the diaphragms are attached to the cover, it is necessary to turn the cover in order to remove any one of the diaphragms that may have to be repaired or cleaned. The space in the engine room is invariably so cramped that it entails tremendous difficulties when this cover has to be turned and diaphragms removed. With the upper halves of the diaphragms remaining with the lower halves, it becomes a very easy matter to lift the cover, and each individual half of the diaphragm can be lifted separately.

Gear Reduction Construction

19. The low-speed gear casing and the two high-speed gear casings must be entirely independent of each other, each casing being supported directly on the foundation structure provided for it.

20. All gear casings must be made of cast iron with rigid supports provided for all bearings supporting pinions or gears. The construction must be of sufficient rigidity to maintain all shafts in parallel relation to each other under any condition of service. The upper and lower covers may be of steel plate construction.

21. The high-speed gear casings shall be arranged with the pinions on the vertical center line, and preferably these gears shall be of the two-pinion bearing type.

22. The gear casings must be designed to provide adequate support for the turbines. The pinions and

		SIBBONEY AND ORBIZABA	BOSTON AND NEW YORK	FIVE OIL TANKERS ATLANTIC REFIN. CO.		SOUTHERN CROSS		MUNARGO		EL COSTON		EL OCEANO		DIXIE		MALOLO	U.S DESTROYERS	U.S. SCOUT CRUISERS
				1ST RED.	2ND RED.	1ST RED.	2ND RED.	1ST RED.	2ND RED.	1ST RED.	2ND RED.	1ST RED.	2ND RED.	1ST RED.	2ND RED.			
TOTAL S.H.P.		4500	3800	3300		6000		5800		7100		5500		8000		6250	13000	22500
S.H.P. PER PINION	H.P. / L.P.	2250	1900	1650	1650	3000	3000	2900	2900	3550	3550	2750	2750	4000	4000	3125	5500 / 7500	11250
R.P.M. PINION	H.P. / L.P.	1507	1990	3195	594	3612	698	2499 / 1814	496	3102	588	3177	467	3240	623	1430	2988 / 1776	2503 / 1477
R.P.M. GEAR		120	.140	594	90	698	110	496	85	588	85	467	80	623	90	120	436	366
PITCH DIA. PINION (INCHES)	H.P. / L.P.	8.5	8.25	6.8	11.221	7.8	14.254	10.6 / 14.6	18.499	10.20	18.499	8.20	18.499	12.8	18.499	11.75	9.916 / 16.688	12.726 / 21.556
PITCH DIA. GEAR (INCHES)		106.15	117.25	36.6	73.998	40.4	90.377	53.4	107.964	53.8	127.98	55.8	107.964	66.6	127.98	140	67.962	87.005
TOTAL WIDTH WORK FACE (IN.)		48	34	26	48	34	56.5	34	56.5	36	60	36	56.5	28	60	57	38	60
NUMBER PINION BEARINGS		3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	3
RATIO * WORKING FACE / PITCH DIA. PINION	H.P. / L.P.	2.88	2.12	1.99	2.18	2.24	2.02	1.65 / 1.20	1.55	1.81	1.65	2.26	1.55	2.38	1.65	2.47	1.97 / 1.17	2.40 / 1.42
PRESSURE PER LINEAL INCH OF TOOTH FACE	H.P. / L.P.	461	429	368	650	395	673	406	705	393	686	369	710	434	729	411	616 / 839	742
PRESSURE PER INCH FACE / PITCH DIA. PINION (INCHES)	H.P. / L.P.	54.3	52.0	54.1	57.9	50.6	47.2	38.3 / 27.8	38.1	38.5	37.1	45.1	38.4	33.9	39.4	35.0	62.1 / 50.3	58.3 / 34.4
PRESSURE PER INCH FACE / √PITCH DIA. PINION (INCHES)	H.P. / L.P.	158.1	149.4	141.1	194.0	141.3	178.1	124.6 / 106.2	163.8	123.0	159.5	129.0	165.2	121.3	169.5	120.0	195.6 / 205.4	208.0 / 159.7
DEFLECTION OF PINION DUE TO BENDING (INCHES)	H.P. / L.P.	00028	00008	00005	00013	00009	00010	00003 / 00001	00004	00004	00004	00008	00004	0012	00005	00013	00008 / 00001	00021 / 00002
DEFLECTION OF PINION DUE TO TORSION (INCHES)	H.P. / L.P.	00117	00058	00043	00095	00060	00094	00033 / 00017	00052	00039	00058	00057	00052	00017	00061	00077	00072 / 00035	00131 / 00046
TOTAL DEFLECTION OF PINION (INCHES)	H.P. / L.P.	00145	.00066	00048	00108	00068	00094	00036 / 00018	00056	00043	00062	00065	00056	00029	00066	00090	00080 / 00036	00152 / 00048
SURFACE PRESSURE #/□" AT TOOTH CONTACT /IN	H.P. / L.P.	51600	50300	54000	55000	52300	49800	45600 / 40100	45000	45600	43900	48400	45200	42700	45200	41500	56800 / 53400	55100 / 44100
YEAR WHEN PLACED IN SERVICE		1918	1923	1920		1921		1922		1924		1925		1928		1927	1919	1921

* FOR PINION WITH 3 PINION BEARINGS . WORKING FACE = $\frac{\text{TOTAL WORKING FACE}}{2} + \frac{1''}{2}$

FOR PINION WITH 2 PINION BEARINGS : WORKING FACE = TOTAL WORKING FACE + $2\frac{1''}{2}$

Details of reduction gears on some of the geared turbine driven ships now in service.

gears must permit removal without disturbing the turbine case mounting. All gear casings must be provided with hand holes for inspection purposes.

23. All bearings must be proportioned so that under maximum load and speed conditions the pressure on projected areas shall not exceed 125 pounds per square inch.

24. The gear wheels shall be made of cast iron or cast steel centers on which are shrunk seamless steel bands.

25. The material in the gear bands shall be of a low carbon steel, and the gear bands must be normalized before being used.

26. All pinions must be integral with the pinion shafts and be made of 3½ per cent. nickel steel, double annealed.

27. The gear must be accurately cut and no hand work allowed on the gear teeth after completion of the cutting process. The gear teeth shall be polished to remove tool marks.

For some time it was thought that pinion material should be chrome nickel steel, heat-treated to high physical properties; however, this material is not satisfactory. The presence of chromium has been found to cause small invisible defects known as "ghost lines" in the forgings, and these imperfections are most dangerous after the teeth are cut in the pinion and have been the cause of pinion teeth breaking. Heat-treatment does not appear to be of great benefit and in many cases has caused internal strains that have resulted in a sprung pinion after the teeth are cut.

The material used by the author's company is a 3½ per cent. nickel, 0.35 per cent. carbon steel, double annealed. This material has, after many years of service, shown itself to be most satisfactory.

The material in the gear bands should be considerably softer than the material in the pinions. The bands must be made by a process that will produce them uniformly and free from hard spots. The material must be normalized before being used, and utmost care must be exercised not to set up excessive internal strains in the bands when they are being shrunk on the bodies. Steel with a carbon content of 0.20 per cent. to 0.30 per cent. has been found to meet all requirements.

The process of gear cutting is without doubt the most important part of gear manufacturing. The outstanding and most vital requirement is accuracy, accuracy in the gear cutting machine itself as well as accuracy in tools, fixtures, and methods needed throughout the hobbing process. Extreme accuracy is essential to avoid wear and noise.

28. The pitch line velocity of the gears shall not exceed 15,000 feet per minute at normal rated speed.

29. The permissible tooth pressure per inch of axial pinion contact shall not exceed 50 times the diameter of the pinion in inches, when operating at normal rated load.

30. The free axial length of tooth contact of pinion

FRAME		A 1st RED.	A 2nd RED.	B 1st RED.	B 2nd RED.	C 1st RED.	C 2nd RED.	D 1st RED.	D 2nd RED.	E 1st RED.	E 2nd RED.
TOTAL S.H.P.		3500		5000		7100		10000		15000	
S.H.P. PER PINION		1750	1750	2500	2500	3550	3550	5000	5000	7500	7500
R.P.M. PINION	H.P.	5600	733	5200	734	4700	732	4200	720	3750	720
	L.P.	4250		3750		3340		3000		2600	
R.P.M. GEAR		733	75	734	80	732	90	720	95	720	100
PITCH DIA. PINION (INCHES)	H.P.	8.2	12.4	9.4	13.94	10.8	15.75	12.8	16.95	14.6	19.4
	L.P.	10.8		13.		15.2		17.8		21.	
PITCH DIA. GEAR (INCHES)		62.6	121.5	66.6	128	69.4	128	74.6	128	76.0	140
TOTAL WIDTH WORK. FACE (IN)		15	44	17.5	49	21	55	24	68	30	78
NUMBER PINION BEARINGS		2	3	2	3	2	3	2	3	2	3
RATIO * WORKING FACE / PITCH DIA. PINION	H.P.	2.13	1.81	2.13	1.79	2.18	1.78	2.07	2.04	2.23	2.04
	L.P.	1.62		1.54		1.54		1.49		1.55	
PRESSURE PER LINEAL INCH OF TOOTH FACE		320	552	368	628	420	705	488	760	577	868
PRESSURE PER INCH FACE / PITCH DIA. PINION (INCHES)	H.P.	39.0	44.5	39.2	45.0	38.9	44.7	38.1	44.8	39.5	44.8
	L.P.	29.6		28.3		27.6		27.4		27.5	
PRESSURE PER INCH FACE / $\sqrt{\text{PITCH DIA. PINION (INCHES)}}$	H.P.	111.7	156.6	120.0	168.1	127.7	177.5	136.2	184.5	150.9	197.0
	L.P.	97.4		102.0		107.7		115.5		125.8	
DEFLECTION OF PINION DUE TO BENDING (INCHES)	H.P.	.00006	.00005	.00007	.00005	.00008	.00006	.00008	.00012	.00012	.00013
	L.P.	.00002		.00002		.00002		.00002		.00003	
DEFLECTION OF PINION DUE TO TORSION (INCHES)	H.P.	.00008	.00055	.00010	.00062	.00013	.00069	.00013	.00097	.00020	.00111
	L.P.	.00005		.00005		.00006		.00007		.00009	
TOTAL DEFLECTION OF PINION (INCHES)	H.P.	.00014	.00060	.00017	.00067	.00021	.00075	.00021	.00109	.00032	.00124
	L.P.	.00007		.00007		.00008		.00009		.00012	
SURFACE PRESSURE AT TOOTH CONTACT #/IN²	H.P.	44700	47100	45000	47500	45100	47600	45000	47900	46100	48000
	L.P.	39600		39200		39000		39200		40000	

* FOR PINION WITH 3 PINION BEARINGS : WORKING FACE = $\frac{\text{TOTAL WORKING FACE}}{2} + \frac{1''}{2}$

FOR PINION WITH 2 PINION BEARINGS : WORKING FACE = TOTAL WORKING FACE + $2\frac{1}{2}''$

Details of production gears for proposed standard marine geared turbines.

shall not exceed 2½ times the pitch diameter of the pinion in inches. (By free axial length is meant the distance from end to end of supporting bearings. For two pinion bearing construction, free length should be figured = tooth contact both helixes + 2½″; the 2½″ allow 2″ between right and left helix and ¼″ from end of pinion teeth to end of adjacent bearings. For three pinion bearing construction, free axial length =tooth contact each helix + ½″.)

The author's company has built numerous gears with pitch line velocities up to 13,000 feet per minute and these gears have been especially quiet in their operation. The Aktiebolaget De Lavals Angturbin of Sweden has made and operated gears as high as 17,000 feet per minute, and it has been reported that some gear reductions have been built by the Ljungstrom Company in Sweden where the normal speed has reached 20,000 feet per minute and that these gears have operated in an extremely satisfactory manner—only possible with highly accurate gears. It is sometimes advantageous when designing gear reduction to use high pitch speeds, and for that reason the suggested specification placed the limit of the pitch line velocity as high as could be done based upon present investigations.

Item 29 limits tooth pressure per lineal inch of pinion to 50 times the pitch diameter of the pinion. This value should be acceptable to even the most conservative. Specifications to allowable pressures vary considerably. There has been considerable trouble with reduction gears both in this country and abroad. In many instances calculated tooth pressures have been far above the limit in item 29. If the gears are not accurately manufactured, the actual tooth pressure may be exceeded by two or three times that calculated, due to the inability of the gears to operate with such contact condition as to properly distribute the pressure over the estimated contact surfaces.

A number of double gear reduction units have been in operation for several years where the pressure at normal rating has been between 35 and 60 times the pitch diameter, and the selection of 50 as given in item 29 was based upon the investigation and performance of these double reduction gears.

31. Flexible couplings must be fitted between turbine shafts and pinion shafts and between first reduction gear shafts and second reduction pinion shafts.

After giving careful consideration to all the details outlined in the specifications, it is suggested that 5 units be considered to cover the range from 3500 shaft horsepower to 15,000 shaft horsepower. The five units are all of the same general design and vary only in size. To reach the maximum commercial economy, it was necessary to go to speeds that have been used in connection with modern geared machines for land service. The high-pressure turbines will have twelve rows of revolving buckets and the low-pressure turbines seven rows of revolving buckets for ahead and three for astern operation. The sizes of wheels have been selected to give the best ratio between the steam speed and bucket speed.

Diesel Engine Lubrication

Part I. The Development of the Diesel Engine as an Economical Prime Mover and its Special Demands for Quality Lubricants

By Arthur M. Tode

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IT is impossible to-day to hold back or even retard the phenomenal progress of the diesel engine. The present era of modern industrial machinery development has seen the diesel engine (frequently termed "oil engine") advance in the past decade to a place of prominence in the generation of power. In its rapid development it has not only covered the field of central power stations, where this type of engine offers an ideal solution of many peak load and stand-by problems, but it has also shown itself to be a revolutionary improvement for propelling the merchant fleets of the world.

The diesel engine has emerged from a period of experimentation to a place among power producers as a practical, efficient, and economical type of prime mover. Diesel engines are being built to-day in sizes and powers which were thought improbable but a few years ago, and their adaptation covers practically every field of industrial, municipal, and marine service. On land, on sea, and in the air have its uses steadily and quickly increased. To-day there is not one field of power generation and use that has not been penetrated by the diesel—from the aeronautic engine to the large stationary engine of 15,000 brake horsepower. The diesel locomotive is making headway in capacities up to 1000 brake horsepower; the diesel rail-car is an established vehicle; the aeronautic diesel has been perfected; and the automotive diesel is coming to the fore. The rapidity with which the development of the diesel engine has progressed is a tribute to the skill and resource of modern engineering.

The development of the diesel engine first progressed along marine lines early in the present century. At that time diesel engines of 100-150 shaft horsepower were the out-standing achievement, although even in those days large powers were being considered. Until recently the power of the diesel engine for land purposes was comparatively small, and, generally speaking, most units installed are not much in excess of 1000 kilowatts. While the first cost per kilowatt was high, due to the multiplicity of units, the advent of the double-acting, 2-cycle engine has altered this position.

Not only are larger powers available in this type of engine but the first cost, weight, and space occupied per kilowatt are all considerably less without in any way reducing the reliability or longevity. Defects sometimes cited against the older types of diesel engines, and ones which were fully exploited by its antagonists, were the lack of reliability and the high cost of maintenance. These defects are not inherent in the present day diesel and certainly cannot be lodged against it in the face of its much greater simplicity and its lack of vulnerable parts, such as exhaust valves, intricate cylinder covers, and high compressed air plant.

The development of the high-powered diesel engine has been almost entirely confined to marine service, a field in which reliability is the first essential. It must be assumed that engines which will satisfy the arduous marine conditions cannot but be satisfactory for land purposes on the score of either reliability or its corollary, maintenance. There is, therefore, not the necessity to-day to subdivide the units as in the past; and the tendency in the future will probably be toward a few large engines rather than a greater number of smaller engines. There are many who believe that the limit in the size of diesel engines has not yet been reached and that the rapid advance made in the past is but an indication of what mechanical and engineering skill will produce in the next decade.

The term "diesel engine," as generally used, is applied to internal combustion engines that burn heavy liquid fuels correctly in their respective cylinders. The distinguishing features of diesel oil engines are that the fuel vapor is not absorbed by air before it is admitted to the cylinder and that no inflammable mixture of vapor and air is compressed preceding its ignition. Diesel engines compress air alone, and the heat of compression is used to ignite the fuel which burns by consuming the oxygen of the air in the cylinder, the engine transforming the heat energy into work. To facilitate and accelerate the burning of a liquid fuel, it must be vaporized, atomized, or intimately mixed with air immediately preceding its ignition. The full diesel type of engine is capable of burning practically any grade of liquid fuel from kerosene to crude oils, and it consumes about one-third as much fuel per unit of power developed as does the average heat engine of corresponding rating.

The diesel engine differs essentially from practically all other devices working with gaseous or liquid fuels. It is in reality an internal combustion engine in contradistinction to other gas and oil engines which are, strictly speaking, internal explosion engines. The diesel engine requires no carburetor, hot points, bulbs, heating torches, electric plugs, or any other device to aid ignition. No electricity is used in connection with its operation. The diesel principle is the ignition of fuel by heat of compression only.

The chief point which distinguishes the diesel from other forms of the internal combustion engine is the injection of oil fuel into a charge of air, which has been previously compressed by the rising of a piston, corresponding to a temperature sufficiently high to insure immediate ignition of the fuel. The fuel is forced into the cylinder by a blast of high pressure air coming from an air compressor.

There are numerous oil engines manufactured here and abroad which, while using a fairly high compression, sufficient to secure ignition of the fuel, do not operate on the diesel cycle, but on what is a combination of combustion at constant volume (The Otto Cycle) and at constant pressure (The Diesel Cycle). These engines, familiarly known as "solid-injection" engines, do not make use of an air blast as the means of oil injection, but depend, instead, on a direct pump action. Such engines, however, are commonly referred to as solid-injection diesel engines. As yet, comparatively few large engines function with airless injection, although their number is increasing. The all-important problem of causing the fuel spray to mix intimately with the fuel air in this type of engine is difficult as combustion not only depends upon the efficient atomization of the charge by the sprayer, but also on its penetration and distribution throughout the combustion space.

The features characteristic of the diesel engine are:

(1.) Compression sufficient to produce the temperatures requisite for spontaneous combustion of the fuel.

(2.) Injection of the fuel by an air blast or directly by pump pressure.

(3.) Combustion with practically no change in pressure with the maximum compression pressure; an absence of explosive effect.

The diesel engine may be of either the 4-cycle type or the 2-cycle type. Practically speaking, these terms imply the number of times the piston must travel from one end of the cylinder to the other in order to complete the combustion of one charge of fuel. It would be more exact, therefore, to refer to such engines as 4-stroke-cycle, or 2-stroke-cycle respectively. Common usage, however, has abbreviated them to the terms 4-cycle and 2-cycle, the matter of strokes being understood as implied.

Such engines are built either as trunk-piston, or as crosshead type. In a trunk-piston engine the connecting rod is connected directly to the wrist pin in the piston and the side thrust, caused by the angularity of the connecting rod, is taken by the piston bearing against the cylinder wall. A crosshead type engine has its connecting rod attached to a crosshead traveling in guides, which crosshead in turn is connected to the corresponding piston. The side thrust caused by the angularity of the connecting rod is taken by the crosshead and guides.

Diesel engines may be separated into stationary, marine, and locomotive engines, according to the service. While there are broad differences in these three classes, yet a number of engines can be adapted for these various services, with special alterations, in certain details, such as the governor arrangement, flywheel, and fuel control. Such engines are also classified as to design; viz., horizontal and vertical; single-acting, double-acting, and opposed-piston type; slow, medium, and high speed.

Essential Lubrication Characteristics

Lubrication of diesel engines and its relation to the development of maximum power with a minimum of fuel consumption requires the careful attention of all owners and operators. The fuel, of course, is essentially the factor which makes the diesel engine run, but the selection of the correct lubricants which must be employed to keep it running is of equal, if not greater, importance. Regardless of whether a lubricant is to serve the engine cylinders or is to be used on the air compressor or bearings, certain basic characteristics are necessary; viz.,

1. It must be so carefully refined as to be able to withstand the usual stresses and strains of intensive service. Also it should be carefully fractionated, or the lighter components so effectively removed that it will not be so volatile as to require an undue quantity to maintain a suitable lubricating film especially on the cylinder walls.
2. It should have as low an emulsification tendency as possible due to the contact with water which may occur. Filtration and very careful refinement will overcome this tendency.
3. It must be suited to the engine and also to the lubricating system installed; for one can readily appreciate that an oil might easily be an excellent lubricant, yet refined in such a manner as to be absolutely unsuitable for diesel engine service.
4. Futhermore, it must be of such a viscosity or body as to maintain a lubricating film of suitable thickness between the wearing surfaces, under the prevailing temperatures of operation. Yet it should never be so heavy or viscous at these temperatures as to give rise to abnormal internal friction within itself, for this might readily develop excessive operating temperatures especially on the engine bearings.
5. It should be sufficiently adhesive to resist being squeezed out from between the wearing surfaces when subjected to the normal pressures of operation.
6. It should not congeal at any of the lower temperatures to which it might be subjected during storage or operation. In this connection the pour test should be low enough to avoid the necessity for ever heating the storage tanks.
7. It should be capable of spreading readily over the wearing surfaces in the case of cylinder walls, not remaining in streaks or blotches whereby suitable sealing of the pistons might be impaired.
8. It must show as little carbon residue as possible, inasmuch as the decomposition which will occur when the oil is exposed to the intensive heat of combustion will, in the case of many oils, develop a large amount of objectionable carbonaceous residuum. Furthermore, this latter should be capable of easy removal.

It is fully appreciated that for an oil to meet all the above requirements the most careful attention is necessary, not only in refining but also in transportation, storage, and handling in the plant. The very best judgment is necessary in the selection of the ultimate oil, taking into account, of course, those requirements which in the particular case are most desired.

Lubricated Parts

In the absence of mechanical deficiencies, an engine will perform more satisfactorily and for a longer period of time when it is effectively lubricated. Conversely, the best of design will be of little avail in lengthening the life of an engine if the quality of a lubricant and the method of its application are not properly studied. This subject has always been of great importance to all diesel engine manufacturers. In order to maintain efficient lubrication the operating factors which impose certain duties upon the oils, as well as the various lubricated parts of the engine, must be considered.

Cleanliness of design, simplicity, and ready access to all parts are the fundamental requirements which have to be met by the builders of modern diesel engines. These factors include a thorough, and yet as little complicated as possible, system or systems of lubrication to assure complete service of oil to the various parts. On most diesels similar lubricating systems are employed, different in detail according to constructional conditions of the machine.

The trend in diesel design is to mechanically lubricate every part and to obviate entirely the hand oil-can. Some manufacturers are building engines which are entirely automatic in their lubrication, while on those engines where some hand oiling is required this has been limited to such parts as the valve gear, cam rollers, fulcrum levers, and governors.

For the purpose of analysis it is practical to classify the several parts of diesel engines requiring lubrication into the following groups:

1. **Power cylinders.** Cylinders of small, high-speed diesel engines employing trunk pistons are sometimes lubricated by the splash method whereby oil is thrown from the bearing systems. The cross-head type, and the larger trunk piston engines have their cylinders lubricated by mechanical force feed lubricators which can be adjusted to deliver a uniform quantity of oil at a regular rate of feed.

2. **Bearings.** The connection rod bearings, crank pins, piston pins, and main bearings are usually pressure-lubricated by one grade of oil throughout. The main bearings of some engines are ring-oiled, while on smaller units the splash system may be employed.

3. **Air Compressor Cylinders.** The air compressors of air injection diesels are lubricated by means of mechanical force feed lubricators.

Diesel engine lubrication must be positive and capable of functioning under sufficiently high pressures to withstand the opposing operating pressures. For example, in the air compressor of a full diesel engine this would be very high, even though the oil may be delivered at a time when the pressure exerted on the piston is lowest.

(To be Continued)

The Chinese Merchant Marine and Its Future Program

By Tsai Pei

Chief of Navigation Department, Ministry of Communications, Republic of China

THE Republic of China has an extensive coast line and many interior waterways. Amongst her principal rivers we may mention the Amur, the Sungari, the Yangtse, the Pearl, the Pei Ho, the Yellow River, and the Huai River, not forgetting that the Grand Canal is the longest of its kind in the world. Briefly speaking, the routes of inland waters navigable for steam vessels are 10,000 miles in length and those navigable for sailing junks are about 13,000 miles, making a total length of more than 23,000 miles, which may be seen from the accompanying table.

Present Situation of Shipping

In former days, water transportation in China was wholly dependent upon native junks. Steamers came into employment only with the organization of the China Merchant's Steam Navigation Company in 1872. Owing to the traditional practice and geographical reasons, transportation of passengers and cargoes by native junks is still very prosperous. The total tonnage of these vessels is about 1,000,000 tons, while that of the steamers is about 500,000 tons. Facing internal unsettled conditions on the one hand and keen foreign competition on the other, the development of China's modern shipping has been rather slow in the recent years. The table herewith shows the number of vessels and total tonnage owned by the different steam ship companies.

NAVIGABLE INLAND WATERS OF CHINA

Name of River	No. of miles navigable for steamers and launches	No. of miles navigable for launches	No. of miles navigable for junks	Total
Rivers of Hopei Province	40	214	1,063	1,317
Rivers of Manchuria	1,829	1,144	2,153	5,126
Rivers of Shangtung Province	36	139	297	472
The Yellow River	—	—	436	436
Main flow and tributaries of the Yangtse River and the Grand Canal	2,139	3,030	6,037	11,206
Rivers of Chekiang Province	36	183	421	640
Rivers of Fukien Province	27	57	552	636
Rivers of Kwangtung and Kwangsi Provinces	722	1,556	1,607	3,885
Total	4,829	6,323	12,566	23,718

FLEETS OF CHINESE VESSELS

Company's Name	No. of vessels	Tonnage
The China Merchants' Steam Navigation Co.	25	42,634
San Pei Steam Navigation Co.	23	41,344
Cheng Kee Steam Navigation Co.	20	23,795
Bureau of Shipping and Navigation of Manchuria	21	11,029
Chao Sing Steam Navigation Co.	6	10,050
Ningpo Shaoshing Steam Navigation Co.	4	6,730
Ta Tah Steam Navigation Co.	8	5,219
The South China Steam Navigation Co.	4	7,807

Of the foreign steamship companies in China engaged in inland and coastwise navigation may be mentioned the Butterfield and Swire, Jardine Matheson and Co., Nisshin Kisen Kaisha, Diaren Kisen Kaisha, and Osaka Shosen Kaisha. The number of vessels, together with their tonnages, of these companies are listed in a tabular statement herewith.

FLEETS OF FOREIGN VESSELS ENGAGED IN CHINESE WATERS

Company's Name	Sea-going Vessels		Inland Vessels		Total	
	Number	Tonnage	Number	Tonnage	Number	Tonnage
Butterfield & Swire	50	116,592	30	42,236	80	158,828
Jardine Matheson & Co.	24	68,206	16	31,179	40	99,385
Nisshin Kisen Kaisha	5	11,680	24	36,462	29	48,142
Diaren Kisen Kaisha	4	12,108	—	——	4	12,108
Osaka Shosen Kaisha	3	7,674	—	——	3	7,674
Total	86	216,260	70	109,877	156	326,137

The causes that have retarded the progress of China's merchant marine may thus be summarized as follows:

1. The existing unequal treaties allow foreign vessels to ply along the coast and in inland waters with no restriction.

2. The foreign steamship companies are better financed than the Chinese and are mostly subsidized by their home governments.

3. Shipbuilding industry is not developed in China, and it is rather expensive to purchase steam vessels from foreign countries.

Plan for Future Development

The Chinese government is now endeavoring to promote the immediate development and extension of the national merchant marine. Plans are being made to modify the right of foreign ships in inland and coastwise navigation. Different regulations have been passed by the Legislative Yuan to encourage shipping enterprise and shipbuilding industry and to safeguard investments therein.

For the sake of improving the main navigable waters and thus giving greater facility to vessels, there have been established various Conservancy Boards, the most important of which are those of the Yangtse River, the Pei Ho, the Huai Ho, and the Pearl River. Above all, the government is making a detailed scheme to form a National Merchant fleet with modern vessels to be allotted to the following lines:

(1) The Yangtse River Line ..... 50 vessels
- a. Shanghai - Hankow ..... 23 vessels
  (2000 tons—4000 tons)
- b. Hankow-Ichang via Hunan ..... 13 vessels
  (1000 tons—2000 tons)
- c. Ichang-Szechwan ..... 14 vessels
  (500 tons—1000 tons)

(2) The North China Line:
Shanghai-Tsingtao & Chefoo-Tientsin ..... 11 vessels
(2500 tons—4000 tons)

(3) The South China Line:
Shanghai-Fukien & Hongkong-Kwangtung 16 vessels
(2500 tons—4000 tons)

(4) China to East Indies, Japan, Europe, and America Line ..... 20 vessels
(6000 tons—10,000 tons)

Such an enormous scheme must of necessity be carried out step by step. It is estimated that first of all a sum of $50,000,000.00 (national currency) must be raised in order to furnish the following lines with sufficient ships to meet the most immediate need:

(1) The Yangtse River Line	12	vessels
a. Shanghai-Hankow	8	"
b. Hankow-Ichang via Hunan	2	"
c. Ichang-Szechwan	2	"
(2) The North China Line	6	"
(3) The South China Line	10	"
(4) China to East Indies, Japan, Europe and American Line	2	"

To make this enterprise a success, the government is ready to welcome investments from foreign countries, for it believes that by fair play and square deal, foreign capital invested in Chinese shipping enterprise will benefit not only China but the whole world as well.

River steamer passing through the gorges of the Yangtse river.

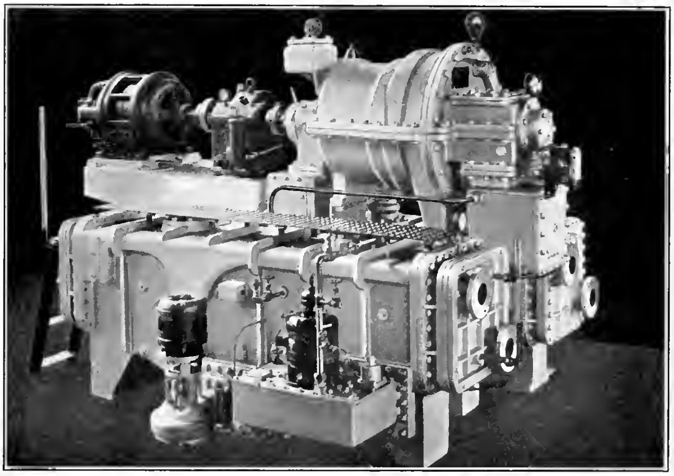
Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part III—Refrigeration Systems

By L. L. Westling

IN Part I of this series we described in outline the demand for and the development of marine refrigeration and marine transport of perishable cargoes. Part II defined terms to be used and discussed the fundamental thermodynamics of refrigeration. In the present section we begin the discussion of the three practical mechanical refrigeration systems; namely, the vacuum system, the absorption system, and the pressure system. The latter is the only one of the three in extensive use on board ship; and we will therefore simply outline the underlying theories of the vacuum and absorption systems and devote the bulk of our space to the pressure system.



Carrier centrifugal refrigeration unit.

Vacuum System

The phenomenon of evaporization of water has been applied to mechanical refrigeration in the so-called Vacuum System in which the low temperature is produced by water vaporizing into a very high vacuum. It was first demonstrated in a practical way in 1775, but because of its bulky proportions and low efficiency it has never been accepted commercially. However, mechanical means for producing high vacuum efficiently may be developed and the vacuum system ultimately return to limited usage.

Absorption System

Another form of refrigeration that has proved more practical than the vacuum system is the so-called Absorption System. This system is never used aboard ship, perhaps because of its extensive proportions, but it represents an important step in the development of refrigeration, using in part the same characteristics of the refrigerant that the compression systems do. A brief description of the cycle will be of value.

Water has a great affinity and capacity for absorbing certain vapors having low boiling points, and water under easily obtained conditions readily releases these vapors. The most generally used vapor is ammonia, and the absorbing properties are shown in the following table. At 20 pounds per square inch pressure, one cubic foot of water will absorb the indicated quantities of anhydrous ammonia vapor at the given temperatures. This characteristic is well to remember in case of serious accident to ammonia systems aboard ship. A liberal application of water from the fire line will clear the atmosphere effectively.

Temperature	32	60	80	100	120	140	160	180	200
Cubic foot of vapor	4600	2800	2150	1700	1190	850	600	370	170

Anhydrous ammonia (NH_3) consists of one part nitrogen and three parts hydrogen in chemical combination, and when existing as a liquid it boils at a temperature of 27.4 degrees Fahrenheit below zero at atmospheric pressure. When it is absorbed by water it combines chemically to form ammonium hydroxide, sometimes called ammonia water or aqua ammonia. The combining action is accompanied by heat, thus:

$NH_3 + H_2O = (NH)_4\ OH + \text{Heat}$ (926 B.T.U. per pound of vapor). The process is reversible, and by the application of energy in the form of heat the anhydrous ammonia is driven off leaving water, thus:

$$(NH)_4\ OH + \text{Heat} = NH_3 + H_2O$$

The cycle starts in a vessel of ammonia water which is heated. The anhydrous vapor leaving the liquid builds up a predetermined pressure, say, 180 pounds per square inch, and, due to its characteristic, this takes place at a temperature of approximately 200 degrees Fahrenheit. The water is left in the vessel called the generator, the vapor passing into a condenser where the latent heat of vaporization is removed by circulating water and the vapor becomes a liquid. The liquid, which is at a pressure of 180 pounds per square inch, is allowed to flow through a valve into a space of lower pressure; i.e., the cooling coils, where the liquid boils or vaporizes, the latent heat being supplied by the surrounding media (air, brine, etc.) The result is that the temperature of the media is lowered, provided, of course, the same is insulated from outside sources of heat. If the coil pressure is maintained at 27 pounds per square inch, the temperature of the vapor as it rises from the boiling liquid would be 4 degrees below zero. This vapor is then drawn by its affinity for water into a vessel containing water, thus reforming aqua ammonia at a pressure of 27 pounds.

The second vessel is called the absorber. The absorber becomes a generator by cross-connecting the system and applying heat, and the former generator becomes an absorber.Thus the cycle is repeated. In actual practice the cycle is continuous, the aqua ammonia in the absorber being pumped into the generator.

Compression Systems

The fundamental principle underlying the compressing type of refrigeration is simply that of a heat "pump" in which heat at a lower potential is "pumped" and discharged at a higher potential, the potential represented in degrees of temperature. It is apparent that it requires a vehicle or medium to accomplish this.

The medium, more specifically defined as the refrigerant, may be a gas or a liquid. When a gas is used the refrigerant employs certain laws of compression and expansion. When a liquid is used the process is a continuous cycle of alternate liquefaction and evaporization, with the accompanying loss and gain of the latent heat of evaporization.

There are an almost unlimited number of refrigerants, their individual characteristics governing our choice. Water, liquid air, and gasoline are all refrigerants, and their boiling points, liquefaction pressures, temperatures, and latent heat values vary widely. It is evident that a large value for the latent heat at pressures and temperatures easily attained by mechanical methods is a prerequisite. Safety of the operating personnel and the corrosive properties of the refrigerant are guiding factors that must be considered.

Air. The most abundant and perhaps the safest refrigerant in use to-day is air. Air can be liquified at high pressures and very low temperatures; but it is a very effective medium when used as a gas, following closely what are known as the laws of perfect gases, Charles Law and Boyles Law. In simplest language these laws may be expressed in a sentence: "The compression of a gas generates heat, and the subsequent expansion thereof generates cold." That is to say, if the gas is compressed and energy thus expended upon it, the energy is stored up in the compressed gas; if the compressor were so perfectly insulated that no compression heat were lost to the outside, the compressed gas would be permanently at a higher temperature. By the use of the above laws, and knowing the initial temperature, the resulting temperature can be calculated mathematically. In the other extreme, if the compression were slow enough in an uninsulated cylinder the sensible heat would be dissipated and the compressed gas would exist at the initial temperature. In practice, the quicker the compression the higher the temperature, approaching Charles Law as a limit. In reversing the operation (that is, expanding the gas) the same law holds true and the opposite condition exists. If, in an insulated cylinder, the gas expands, giving up its stored energy by doing work, the expanded gas will be at a final lower temperature, which can likewise be calculated. A so-called perfect gas will follow the law exactly, each gas has its own corrective factor, but air follows closely the basic law. Therefore, air, owing to its safety and abundance, is especially adaptable as a refrigerant.

In practice, the air is generally compressed by a steam engine; the air is raised to a predetermined pressure and a correspondingly high temperature. It is then cooled to as low a temperature as practicable by passing air or water over cooling coils, and is then passed through a chemical chamber where the moisture is absorbed to prevent snow formation during expansion. It is then led to a cylinder and expanded, where it does work assisting the steam cylinder, thus expending its stored energy; and a drop in temperature results. The cold air is then discharged into coils or into a chamber direct, absorbs heat, and is again drawn back into the suction of the compressor. The so-called dense air machine has been widely used. It was formerly especially popular with the British. Following is a tabulation of data taken from an actual installation:

Steam cylinder	12" dia. x 15" stroke
Compressor cylinder	27" dia. x 18" stroke
Expansion cylinder	22" dia. x 18" stroke
Revolutions per minute	62
Air pressure, compressor discharge	65 lbs. per sq. inch
Air temperature, compressor suction	52 deg. Fahr.
Air temperature, compressor discharge	267 deg. Fahr.
Cooling water, in	57 deg. Fahr.
Cooling water, out	145 deg. Fahr.
Temperature of air into expander	70 deg. Fahr.
Temperature of air out of expander	82 deg. below zero F.
Work done on air by compressor	43.12 I.H.P.
Work done by expander	28.05 I.H.P.
Work done by steam cylinder	24.60 I.H.P.
Work equivalent lost in cooling water	19.00 I.H.P.

The more generally used modern pressure systems employ a medium which changes its state; that is, a vapor or gas to liquid, and from liquid to vapor or gas,

PROPERTIES OF SULPHUR DIOXIDE (Arranged from Zeuner)

Temperature	Gauge Pressure	Latent Heat	Volume of one Pound of Vapor.
-22	18.6" vac.	172.8	12.72
-13	15.2"	172.0	10.07
- 4	11.1"	171.0	8.05
5	6.0"	169.7	6.48
14	0.0 Lbs	168.2	5.26
23	3.6	166.3	4.30
32	7.8	164.2	3.54
41	12.8-	161.7	2.93
50	18.6	158.9	2.44
59	25.2	155.8	2.04
68	32.9	152.5	1.71
77	41.7-	148.5	1.45
86	51.7	144.8	1.22

PROPERTIES OF ETHYL CHLORIDE (Zeuner)

-22	23.6" vac.	193	34.2
-13	24.3"	192	26.5
- 4	22.6"	191	20.9
5	20.5"	190	16.7
14	18.8"	188.5	13.5
23	15.2"	187.5	11.0
32	11.6"	186	9.1
41	5.6"	184.5	7.6
50	2.3"	182.5	6.3
54.5	0.0 lbs	181.5	5.6
59	1.40-	180.6	5.4
63	4.56	179.5	4.55
77	8.2	176.5	3.9
86	12.4	174	3.35

Properties of Anhydrous Ammonia

Arranged from U. S. Bureau of Standard's Tables

Gage Pressure Lbs per Sq.in	Saturated Temperature Degrees F	Volume Cubic Feet per pound	Latent Heat of Evaporization B.t.u.
0	-28.0	18.0	589.3
1	-25.6	16.9	587.6
2	-23.4	16.0	586.0
3	-21.2	15.1	584.5
4	-19.2	14.4	583.0
5	-17.2	[illegible]	581.6
6	-15.3	13.1	580.2
7	-13.5	[illegible]	578.9
8	-11.5	12.0	577.6
9	-10.1	11.	576.3
10	- 8.4	11.1	575.2
11	- 6.9	10.7	574.0
12	- 5.3	10.3	572.9
13	- 3.8	9.96	571.7
14	- 2.4	9.62	570.6
15	- 1.0	9.32	569.5
16	+ .4	9.04	568.5
17	1.7	8.78	567.5
18	3.0	8.55	566.5
19	4.3	8.28	565.5
20	5.5	8.06	564.4
21	6.7	7.85	563.7
22	7.9	7.65	562.7
23	9.1	7.46	561.8
24	10.2	7.28	560.9
25	11.3	7.11	560.0
26	12.4	6.94	559.1
27	13.5	6.78	558.3
28	14.5	6.63	557.4
29	15.6	6.49	556.6
30	16.6	6.35	555.8
31	17.6	6.22	555.0
32	18.6	6.09	554.2
33	19.5	5.97	553.4
34	20.5	5.85	552.6
35	21.4	5.74	551.9
36	22.3	5.64	551.1
37	23.2	5.54	550.4
38	24.1	5.44	549.7
39	25.0	5.34	548.9
40	25.8	5.25	548.2
41	26.7	5.16	547.5
42	27.5	5.07	546.8
43	28.3	4.99	546.1
44	29.2	4.91	545.5
45	30.0	4.83	544.8
46	30.8	4.76	544.1
47	31.5	4.68	543.5
48	32.3	4.61	542.8
49	33.1	4.54	542.2
50	33.8	4.48	541.5
51	34.6	4.41	540.9
52	35.3	4,35	540.2
53	36.1	4.29	539.6
54	36.8	4.23	539.0
55	37.5	4.17	538.4
56	38.2	4.12	537.7
57	38.9	4.06	537.1
58	39.6	4.01	536.5
59	40.3	3.96	536.0
60	49.9	3.91	535.4
61	41.6	3.86	534.8
62	42.3	3.81	534.2
63	42.9	3.77	533.7
64	43.5	3.72	533.1
65	44.2	3.67	532.5
66	44.8	3.63	531.9
67	45.5	3.59	531.3
68	46.1	[illegible]	530.8
69	46.7	3.51	530.2
70	47.3	3.47	529.7
71	47.9	3.43	[illegible]
72	48,5	3.39	528.6
73	49.1	3.35	528.1
74	49.7	3.32	527.6

Pressure	Temperature	Volume	Latent Heat
75	50.3	3.28	527.0
76	50.9	3.24	526.5
77	51.5	3.21	526.0
78	552.0	3.17	525.5
79	52.6	3.14	525.0
80	53.1	3.11	524.4
81	53.7	3.08	523.9
82	54.3	3.05	523.4
83	54.8	3.02	523.0
84	55.3	2.99	522.5
85	55.8	2.96	522.0
86	56.4	2.94	521.5
87	57.0	2.91	521.0
88	57.5	2.88	520.5
89	58.0	2.85	520.0
90	58.5	2.82	519.5
91	59.0	2.80	519.0
92	59.6	2.77	518.5
93	60.1	2.75	518.0
94	60.6	2.72	517.6
95	61.1	2.70	517.1
96	61.6	2.68	516.6
97	62.0	2.65	516.1
98	62.5	2.63	515.7
99	63.0	2.61	515.3
100	63.5	2.59	514.8
102	64.5	2.54	513.9
104	65.4	2.50	513.0
106	66.4	2.46	512.1
108	67.3	2.42	511.2
110	68.2	2.39	510.3
112	69.1	2.35	509.4
114	70.0	2.31	508.6
116	70.8	2.28	507.8
118	71.7	2.25	506.9
120	72.6	2.21	506.0
122	73.4	2.18	505.2
124	74.2	2.15	504.4
126	75.1	2.12	503.6
188	75.9	2.09	502.8
130	76.7	2.06	502.0
132	77.5	2.04	501.2
134	78.3	2.01	500.4
136	79.1	1.98	499.6
138	79.9	1.96	498.9
140	80.6	1.93	498.1
142	81.4	1.91	497.3
144	82.2	1.89	496.5
146	82.9	1.86	495.8
148	83.6	1.84	495.0
150	84.4	1.82	494.3
152	85.1	1.80	493.5
154	85.8	1.78	492.8
156	86.5	1.76	492.1
158	87.2	1.74	491.4
160	88.0	1.72	490.7
162	88.6	1.70	490.0
164	89.3	1.68	489.2
166	90.0	1.66	488.5
168	90.7	1.64	487.8
170	91.4	1.62	487.0
172	92.0	1.61	486.4
174	92.7	1.59	485.7
176	93.4	1.57	485.0
178	94.0	1.56	484.3
180	94.7	1.54	483.6
182	95.3	1.53	482.9
184	95.9	1.51	482.2
186	96.6	1.50	481.5
188	97.2	1.48	480.9
190	97.8	1.47	480.2
192	98.4	1.45	479.5
194	99.0	1.44	478.9
196	99.7	1.43	478.2
198	100.3	1.41	477.5
200	100.9	1.40	476.9

and which involves the latent heat of evaporization. Such refrigerants may be classified into three groups, low pressure, medium pressure, and high pressure. Low pressure refrigerants are those a part of whose refrigerating cycle involves generally the use of pressure of less than atmospheric pressure or partial vacuum and include sulphur dioxide, and ethyl chloride, and Dichloromethane, or Carrene.

Medium pressure refrigerants use pressures from atmospheric up to 200 pounds per square inch. The principal example in this range is anhydrous ammonia.

High pressure refrigerants operate at pressures of 200 pounds per square inch and above, as represented by carbon dioxide.

Refrigerants of low pressure classifications, while existing as a gas or vapor, are obviously highly rarified; that is to say, their density is very low, and when we calculate the heat capacity per pound we must realize that larger volumes of the gas must be handled.

The reverse is also true. The high pressure refrigerant that has dense gas on the low pressure side requires but small volumes. In consequence, large compressors are required for low pressure refrigerants, and compressors for the high pressure types are small. This gives rise to the general statement that the efficiencies of the various types of refrigerants are nearly equal.

Anhydrous Ammonia. The most widely used refrigerant is anhydrous ammonia because of its high latent heat and its easily maintained working pressures. To show clearly its refrigerating cycle we will describe the simplified form.

Assume a cylinder of anhydrous ammonia (hereinafter referred to as ammonia) having a temperature of, say, 77 degrees Fahrenheit and the corresponding pressure of 132 pounds per square inch. This is a state of equilibrium, the ammonia existing as a liquid, except the portion at the top of the cylinder which holds ammonia vapor at the same pressure and temperature. From some external source of heat the ammonia is raised in temperature to, say, 84.4 degrees Fahrenheit. Evaporization takes place from the surface of the liquid, making the vapor more dense and increasing the pressure to 150 pounds per square inch. At this pressure evaporization ceases, and equilibrium is once more established.

Invert the cylinder and connect a coil of pipe to the valve, the coil to be enclosed in an insulated chamber,

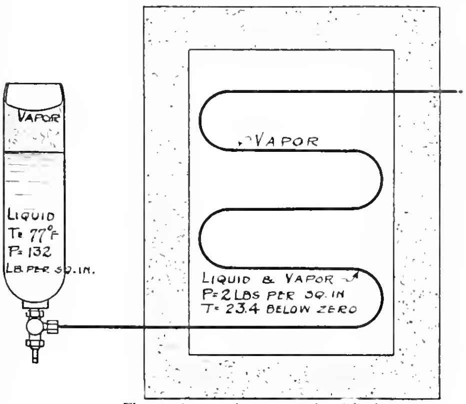


Fig. 6. Ammonia system simplified.

and then to discharge to the atmosphere. (See Fig. 6) Open the valve slightly, allowing the pressure in the cylinder to force the liquid into the coil. At the reduction in pressure the liquid boils within the coil. As before shown, boiling must accompany the absorption of heat (latent), hence the necessary heat is taken from the air within the chamber and the walls of the chamber. Should the coils be restricted at the atmospheric outlet to produce a back pressure of, say, two pounds per square inch, the ammonia in the coils will attain a temperature of 23.4 degrees below zero Fahrenheit. As long as a drop of the liquid remains in the cylinder the pressure will remain at the figure corresponding to this temperature. If a temperature of 23.4 degrees below zero Fahrenheit could be reached within the chamber, the boiling in the coils would cease and the liquid could stand in the coils, equilibrium again having been found. With a means to collect the expanded vapor and restore the ammonia to the cylinder in liquid form, the complete cycle of refrigeration is supplied.

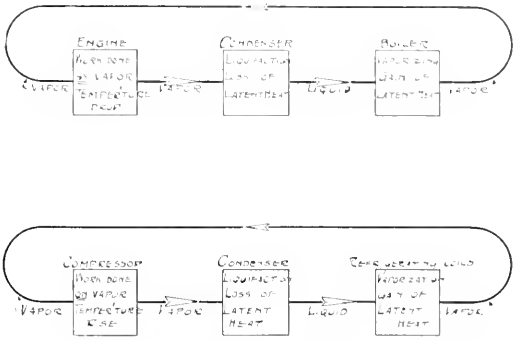
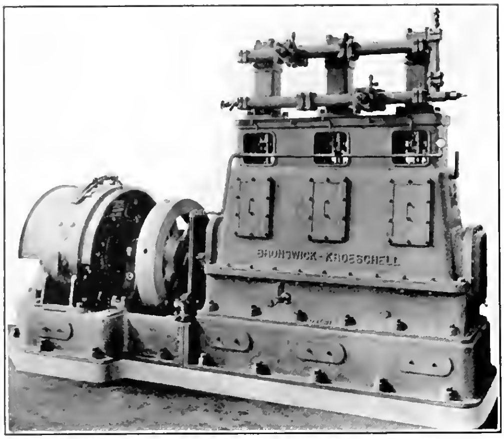


Fig. 7. Comparison of steam power cycle (upper) with refrigeration cycle (lower).

The compression refrigeration cycle is merely the reversed principle of the steam power cycle, as shown in Fig. 7. In the steam power cycle an external supply of heat is absorbed, vaporizing the liquid, which, upon expanding to lower pressure and greater volume, does work. The expanded vapor has its latent heat of evaporization removed by the condenser circulating water restoring its liquid state. The latent heat is then regained from the furnace fires. The external heat produces (1) work, and (2) the latent heat which is lost to the condensing water. In the refrigeration cycle an external supply of energy is absorbed raising the vapor from low pressure and large volume to high pressure and small volume. The latent heat is absorbed by the condenser circulating water and liquefaction results. The liquid then expands into vapor, absorbing an external supply of heat which is the latent heat of evaporization and which is supplied by the objects being refrigerated. The power applied completes the cycle. In the comparison, the boiler and the refrigerating chamber coils are analogous, the condensers function the same and the engine and compressor act opposingly, which reserves the direction of heat flow in the cycles.

Carbon Dioxide. All compression systems have the same component units. Carbon dioxide is growing rapidly in favor as a refrigerant. It is composed of one part carbon and two parts oxygen by weight (CO_2), and



Brunswick-Kroeschell motor-driven carbon dioxide compressor.

as a gas it is very dense as compared to air or ammonia vapor. At 68 degrees Fahrenheit an equal weight of ammonia vapor has 100 times the volume of carbon dioxide. Its latent heat is approximately one-eighth that of ammonia. Its density at working pressure is its virtue, as it allows small sized compressor cylinders and allied pressure equipment, which permits the necessary strength of containers. Carbon dioxide at 68 degrees Fahrenheit has a vapor pressure of 840 pounds per square inch. In the tropics, where water of 86 degrees and above is used as circulating water, it builds up very high pressures. Carbon dioxide at 88 degrees Fahrenheit has a vapor pressure of 1085 pounds per square inch. Because of these pressures carbon dioxide has not been universally accepted; but, with the modern tendencies in all things toward higher pressures, objectionable features in equipment have been eliminated and carbon dioxide is rapidly coming into its own, even in small sized units. Carbon dioxide has added advantages in that it is noncorrosive, and normal amounts of it are not injurious to human life. Carbon dioxide is often called carbonic acid.

Due to the high pressures involved, carbon dioxide

PROPERTIES OF CARBON DIOXIDE.

Temperature Deg. F.	Pressure Lbs per sq. in.	Volume of One pound, cubic feet.	Latent Heat of Evaporization
-25	218.1	0.4575	127.13
-20	235.7	.4173	125.25
-15	255.2	.3810	123.46
-10	276.5	.3481	121.44
- 5	298.8	.3185	119.30
- 0	322.7	.2918	117.00
5	348.9	.2672	114.70
10	377.2	.2450	112.35
15	405.7	.2244-	109.64
20	436.3	.2060	106.83
25	469.4	.1882	102.82
30	503/5	.1724	100.47
35	540.2	.1580	97.26
40	579.2	.1444	95.99
45	620.7	.1323	89.78
50	664.7	.1205	85.54
55	710.7	.1090	80.82
60	758.7	.0916	75.69
65	808.7	.0830	70.17
70	861.7	.0816	63.33
75	920.7	.0706	55.40
80	979.7	.0614	46.00
85	1040.7	.0500	30.23
87	1066.7	.0440	23.82
88.43	1085.7	.0[illegible]46	0.00

refrigeration is seldom used as a direct expansion system. The system is confined to a small section of the vessel, and brine is cooled in a carbon dioxide evaporator and the chilled brine is distributed by pumps to the various points of application.

Two Diesel Books

DIESEL ENGINE OPERATION, MAINTENANCE, and REPAIR. By Charles H. Bushnell. 285 copiously illustrated pages; bound in red cloth with gold stampings. Published by John Wiley and Sons, New York. Price $3.50 net.

Here is another San Francisco author who has produced a worth while book. He presents the operation of the marine diesel engine from the standpoint of an operating engineer; and does it in a very useful fashion.

As the author says of his own book, "In a sense it is passed up from below rather than handed down from above. I am not an authority on diesel engines. I simply offer this as a result of my experiences, observation, and study. If this book gives the reader a new point of view on some of the problems or a few hints that will aid in operation and maintenance, it will have served the purpose intended. It is not intended that the reader should go into an engine room with this book in one hand and a monkey wrench in the other. The various methods of procedure are treated more in principle than in detail and must be modified to suit existing conditions."

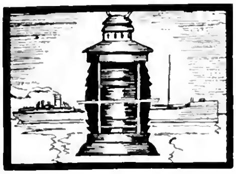
We heartily recommend this book for students, mechanics, and operating diesel engineers. It contains many practical hints and much operation information not easily obtainable in other diesel literature.

DIESEL ENGINES, MARINE—LOCOMOTIVE—STATIONARY. By David Louis Jones. 500 (6x9) pages, 280 illustrations. Printed by Norman W. Henley Publishing Co., New York. Price $5 net.

A practical book by a practical man. The author is a commissioned chief machinist in the United States Navy and instructor in the Diesel Engine Department, United States Navy Submarine School. This volume was written and compiled with the object of presenting in simple, direct fashion to the practical engineer and mechanic the elementary principles, care, and operation of the diesel engine.

Three chapters (41 pages) are devoted to elementary principles and a comparison of advantages and disadvantages of the diesel. Next come five chapters (123 pages) of details of construction and equipment. Then two chapters (40 pages) on testing and operation. A chapter of 152 pages describes in considerable detail all the principal American makers of diesel engines and then come six chapters with the following titles: 1000 H.P. Submarine Diesel; Diesel Electric Drive for Ships; Fuel and Lubricating Oils; Rules for Diesel Motorships; Two Hundred Diesel Engine Pointers; and Diesel Engines for Railroad Service.

In short, here is a very complete diesel treatise for any American engineer, mechanic, or layman who wishes to become better acquainted with this very economical prime mover.



Marine Equipment

SMOKE INDICATORS — ELECTRIC GALLEYS
VENTILATING FANS — SIGNAL SYSTEMS

Photo-Electric Smoke Indicator and Recorder

THE photo-electric cell is being used in many spetacular and some very useful applications recently and is receiving comment in the press, particularly in relation to its ability as a burglar alarm. One of the most insidious burglars of the operating profits of steamships is Old Man Incomplete Combustion, who works so silently and effectively that he is discovered only as he is vanishing into thin air above the top of the stack. Now, however, the photo-electric experts of the Westinghouse Electric & Manufacturing Company are on the trail of this bold robber of heat units and have prepared an effectual alarm and recording device which will nip in the bud all of his schemes.

Application

The photo-electric smoke indicator and recorder is a reliable and accurate instrument that gives to the operator a continuous indication of the conditions of combustion in the form of smoke density, and makes a record of these indications.

It is an accepted fact that smoke results from improper combustion, and this can almost always be remedied. Therefore, the density of smoke leaving the stack should be continually indicated to the operator. Methods of smoke determination in the past have depended upon the human eye for judging the density. Such a means of judging is inaccurate, even during the day, as weather conditions vary, and altogether ineffective at night. Thus the photo-electric smoke indicator and recorder is a new instrument to promote increased combustion efficiency.

In obtaining combustion efficiency, the smoke indicator and recorder will also prove helpful in combination with the carbon dioxide meter. If the operator is required to maintain a maximum percentage of carbon dioxide he will obviously be crowding very close to the point at which smoke will occur, due to a deficiency of air. Therefore, it is desirable to give the operator an instrument which he can use with the carbon dioxide meter in such a way as to obtain a maximum of carbon dioxide and at the same time a minimum of smoke.

When smoke occurs it is generally an indication of serious losses, not because of the soot, but on account of the unburned, invisible combustible gases which are distilled from the coal and not burned when insufficient air is present.

Operation

A beam of light projected through the smoke onto the photo-electric cell varies in intensity with the density of the smoke. Variations in the light striking the cell causes like variations in the current flowing through the cell. This current when amplified is measured by indicating or recording instruments calibrated in degrees of smoke density as read on a Ringelman Chart If so desired a light or alarm bell can be operated.

Construction

The device consists of two main parts: first, the light-source unit, and the photo-electric amplifier and control unit, mounted on opposite sides of the stack or breeching; second, the indicating or recording instruments, as well as the bell alarm or indicating lamp, located in the boiler room or any other convenient location.

The method of mounting the apparatus on the stack is shown in the illustration. The pipes pass through the walls of the smokestack in semi-flexible packing joints. This is necessary because it has been found that at high ratings, particularly in large stacks, the walls of the stack or breeching warp considerably due to the high flu-gas temperature. The pipes on which the units are mounted are joined inside the stack by a spacer in which is the smoke orifice. The spacer forms a rigid connection between the pipes, thus assuring maintenance of alignment, but at the same time permitting the flow of smoke through the light beam which traverses the pipes and orifice. By using an orifice of given length which allows a definite portion of the smoke to cross the beam of light, the total diameter of the stack has no influence on the calibration of the device.

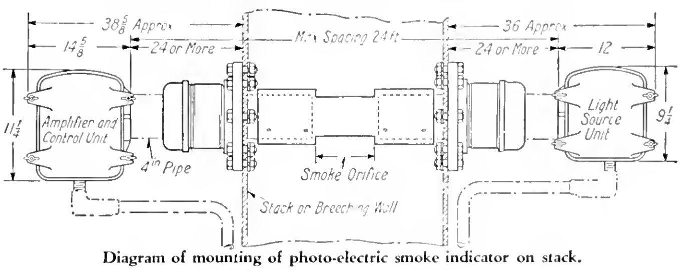
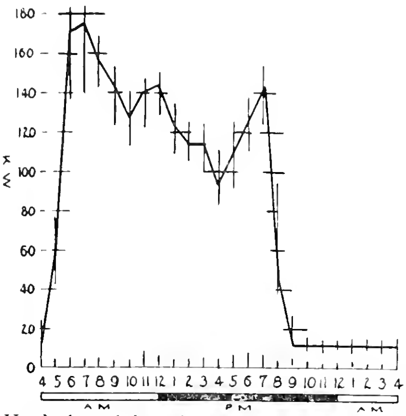


Diagram of mounting of photo-electric smoke indicator on stack.

Electric Galleys on Modern Ships

MODERN ships are equipped throughout with labor-saving devices, particularly in the galleys, where electric equipment has supplanted the old style equipment that required continuous effort on the part of the personnel to produce food of fair quality. The adoption of electric cooking and baking equipment aboard ship has materially improved the quality of food prepared, eliminated fire hazard from the galley, made available more deck area for other uses, and reduced maintenance costs in this department of the vessel. A famous general once said that an army marches on its stomach. While this is not true of a ship, the popularity and acceptance by the public of any passenger steamship is largely based on the quality of food and the service rendered. Electric equipment makes possible the best preparation of food and the most rapid service, hence such leading steamship organizations as the Matson Navigation Company, the Panama Pacific Line, the Dollar Steamship Company, and many others have selected electric equipment for the galleys of their new ships.



Hourly demand chart of galley equipment on Malolo which has a total connected load of 301 kilowatts.

Electric galley equipment is divided into two classes, one of which is called high temperature apparatus, including ranges, broilers, griddles, and fry kettles, and the other is termed low temperature apparatus, taking in roasting and baking ovens. The advancement of high temperature equipment has been most remarkable since the development of the Calrod electric element by the General Electric Company. Calrod elements are used in the cooking surfaces of heavy duty ranges and in all pieces of Edison equipment where high temperatures are required.

Calrod consists of a resistor of calorite, the finest grade of nickel chromium wire, surrounded by powdered magnesium oxide, the whole being encased in a protective metal tube. This type element eliminates the two main reasons why electric elements fail. First, being protected by the magnesium oxide and the metal tube, all air is kept away from the calorite resistor, which naturally eliminates all possibility of oxidation. Second, the protective metal tube protects the delicate resistance wire from all mechanical harm and also from spilling, caking, and burning of greases, sugars, or other foods. In low temperature apparatus, such as the electric baking and roasting ovens, open nichrome wire elements are used, with the coils so spaced that the heat generated is evenly distributed over every square inch of deck area in the oven chambers.

Modern electric galley equipment can be termed "custom-built for the galley" as there is a special piece of equipment designed for each cooking operation, such as cooking tops for surface work; electric roasting oven which is most efficient for the roasting of meat; the fry kettle for the preparation of deep fat products, such as French fried potatoes or chicken croquettes, electric broilers for the production of broiler products, griddles for surface frying, toasters for the preparation of breakfast and garnishing toast, electric stock kettles for the preparation of soups and stocks, and electric bake ovens for the production of all bread, pastries, and sweet goods. By using pieces of equipment adapted to special work, much space can be saved in the galley lay-out. This increases the efficiency of the equipment installed and the service rendered by the steward's department, a prime factor in the minds of operating stewards.

Demand Factors

It is interesting to divert from the mechanical structure of galley equipment and discuss the load problems involved. A most interesting test was made by Grant Call, manager of the Hotel and Bakery Division of the Edison General Electric Appliance Company, upon the electric galley equipment installed on the steamship Malolo. This equipment consists of electrical apparatus with a total connected load of 301 kilowatts. At no time during a twenty-four hour period of her maiden voyage was the maximum demand in excess of 185 kilowatts. This indicates a splendid diversity. The peak demand occurred between 6 and 8 a.m. daily and tapered off gradually during the afternoon period, with an average demand of 46 kilowatts at 8 p.m. when the lighting peak was established. The maximum demand of the total load on the generators amounted to 538 kilowatts and occurred regularly at 8 p.m. when the galley demand was reduced to a maximum of 46 kilowatts.

Chart No. 1 shows the combination curves of total galley and auxiliary demand. You will note that the galley demand, which is the small curve, is indeed a small portion of the total auxiliary demand.

Operating Factors

The operation of the equipment in general is as follows: All heavy roasting and baking is done during the early morning hours from 6 o'clock until noon. Practically all of the heavy cooking is out of the way by 4 p.m., but there is a slight increase in demand for short order cooking during the dinner hour. This dinner hour peak is greatly reduced under the morning peak period for heavy cooking. During the night from 8 p.m. until 6 a.m. all the range and broiler equipment is turned off completely and only the bake oven equipment is operated.

Energy Consumption

The daily kilowatt hour consumption of the galley equipment amounted to 2088 kilowatt hours against a total load of 9774 kilowatt hours. This record shows that the galley consumption amounted to

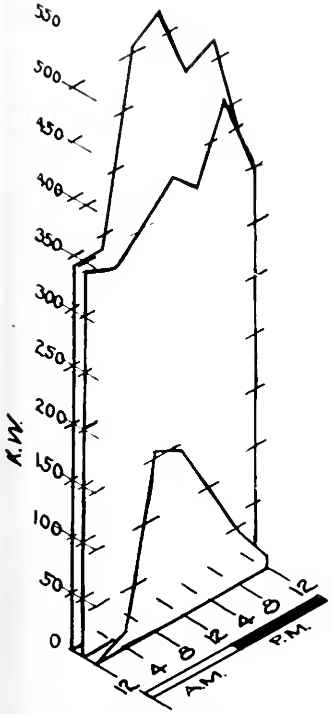


Chart No. 1. Showing curves of demand on galley and auxiliary installations and total demand.

only 21 per cent. of the total connected load.

Energy Fuel Cost

Records show that a total of 601 persons were fed an average of three meals daily, making a total average of 1755 daily meals, with a total daily energy consumption of 2086 kilowatt hours. The watt hour consumption per person per meal amounted to 1188, which is remarkably low for marine service. With an estimated fuel cost of seven mills per kilowatt, this makes the electric energy cost .0083 cent per person per meal.

It must be appreciated that the equipment has a capacity for cooking almost 100 per cent. more meals per day than were served on the maiden voyage. All the ranges and ovens were in daily use and heated the same as if the galley had been operated at a maximum capacity. No attempt was made to cut out certain units of equipment due to the limited passenger list, and an increased number of meals would have greatly reduced the watt hour consumption per meal.

The Edison General Electric Appliance Company division of the General Electric Company has equipped a number of ships with electric galley equipment, including the steamships Malolo, Matsonia, California, Pennsylvania, Virginia, Leviathan, Republican, George Washington, U.S.S. Lexington, U.S.S. Saratoga, Southern Pacific ferryboats, and tankers of the Standard Oil Company.

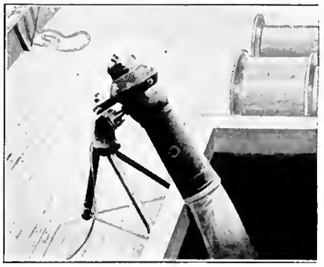
An Efficient Ventilator

A QUICK and efficient method for auxiliary ventilation of ships has been recently introduced. It is a new type of light weight blower that can be used for ventilation of holds, engine rooms, tanks, and other confined spaces where the air supply is below par.

The convenience of the unit is a feature. It is mounted on a swivel jointed tripod which allows the diffuser outlet to be placed at any desired angle so that the air supply is directed where it is most needed. It weighs less than a hundred pounds; and because of its light weight is readily portable so that it can be quickly set up and put into operation by one man.

The fan is of the propeller type and its construction is worth comment. Stationary guide vanes of special design are used beyond the propeller. The air current leaving the propeller is radially subdivided by the individual guide vane blades and taken up by them without shock.

The guide vane blades, which have a curvature increasing in the direction of rotation of the propeller, concentrate the air current and give it a further acceleration inside of the stationary guide vanes, so that a considerable part of the pressure is produced in the latter. A large part of the end thrust is thus taken up by the stationary guide vane casing. The air streams into which the flow of air has been subdivided by the guide vane blades, leave the guide vane casing, on account of the kinetic energy, slightly rotating and convergent toward the axis so that the smallest section of the air flow is reached beyond the guide vane casing. This, in actual operation, makes the blower extremely efficient for use with or without duct extension, since its power consumption stays constant at constant speed irrespective of length or diameter of duct extension.



Swivel-mounted ventilating fan.

The equipment is known as the Coppus Portable Vano Ventilator, and is manufactured by the Coppus Engineering Corporation of Worcester, Massachusetts, manufacturer of a complete line of blowers and exhausters.

Electric Heaters for Staterooms

IN keeping with the trend of the marine industry toward electrification, electric heating of staterooms is becoming very popular both from the standpoint of the passenger and the ship owner.

Two de luxe passenger vessels for the Dollar Steamship Line, now being built by the Newport News Shipbuilding and Dry Dock Company, are being equipped with electric heaters for staterooms and bathrooms. This method of heating staterooms has numerous advantages inasmuch as it is easily regulated by the individual passenger and is much more economical from the standpoint of the operating company because of the lower installation cost and ease of servicing.

The heaters furnished for the Dollar liners were especially constructed by the Westinghouse Electric and Manufacturing Company, meeting requirements for making such devices more adaptable to marine construction which necessitates some quite radical changes from similar heaters which would be used in house heating. The heaters are constructed for surface mounting on either the bulkhead or inside partitions and are arranged so that the projection of the heater into the room is cut to the minimum.

They are also made narrow to conserve space and allow proper arrangement of stateroom furniture. Each heater is controlled by a switch which is a part of the heater; and the heating element, which is a radiant type, is adequately guarded. The outside casing of the heater is white enamel finish and has a sloping top to prevent passengers from draping wet towels or bathing suits over the heater. These heaters are of 100 watts capacity and the distribution of the heating element is such that the density of the heat thrown out past the guard is not sufficient to become dangerous.

In addition to the attention given the marine electrical and construction requirements, special consideration was given to developing a general design which would harmonize with the fittings of the most luxurious stateroom.

Automatic SOS for Lifeboats

RALPH HEINTZ, radio engineer and construction engineer for Heintz & Kaufman, San Francisco commercial radio equipment manufacturers, has invented a very ingenious automatic transmitting radio set for sending out the international distress signal from lifeboats at sea. The apparatus has been fully tested and demonstrated and the lifeboats of the new palatial Dollar Round-the-World liner President Hoover will be equipped with these sets.

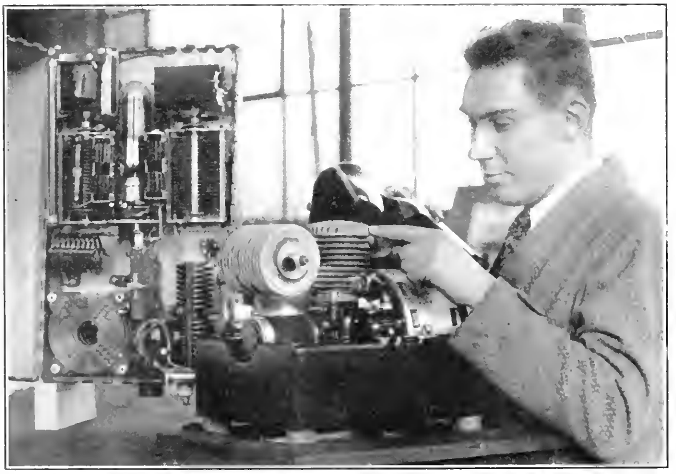
The generator on the Heintz set may be driven either by a hand crank or by the special light weight gasoline engine designed and manufactured by this firm for producing power for airplane radio transmission.

This lifeboat radio set is fully automatic. If the gasoline engine is operative, pressing a button starts the set, which will continue to send out S.O.S. signals with a sure range of about 500 miles by day and a possible range of 2000 miles by night. If the gasoline engine is inoperative, turning the crank gives the same results. No radio operator is needed, no adjustment and no care—just press the button and immediately every one equipped with radio within 1000 miles will hear the distress signal and every steamer equipped with radio compass will be taking bearings.

Interchange of these bearings between two or three steamers will give approximate location of lifeboat, close enough to enable the nearest steamer to proceed at once to the spot and pick up the boat or boats.

This light weight, comparatively inexpensive, efficient equipment should be in every lifeboat.

Press-the-Button Service is the title of a bulletin issued by Kohler Company, Kohler, Wisconsin, covering the convenience of electrical power supplied by small self-contained units, whether for farm, home, pleasure craft, or emergency at sea.

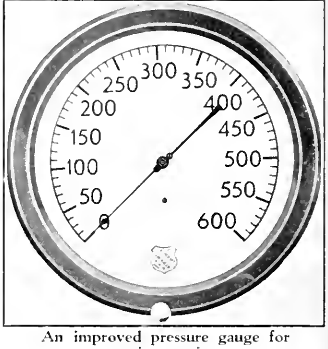


Radio set which operates automatically, sending out the international distress signal, and which may be cranked by hand in case of damage to the gasoline engine which drives it.

Improved Pressure Gauge

WITH the advent of higher pressures and temperatures in steam power practice afloat and ashore, there has been developed a definite need for a more durable and more accurate pressure gauge. Working under constant vibration and pulsations in pressure, the movement mechanism in the ordinary commercial gauge soon began to wear and it was evident that some better material must be found for these parts of gauges.

Various bronzes were tried out, bushings of monel metal were tested, but these although in many instances showing remarkable improvement, were not entirely satisfactory.



An improved pressure gauge for marine service.

The Consolidated Ashcroft Hancock Company, Inc., set its laboratories on the task of solving this problem; and after many experiments a special movement of nitralloy steel was developed. Severe tests over a period of six months on a number of sample movements proved that this material would outwear 100 ordinary bronze movements.

Special springs were developed for use with this new movement. These were bored out of the solid in a special steel alloy and were so treated that their expansion and contraction were absolutely uniform throughout the range of the gauge. The use of these springs made possible uniform graduations on the dial and a guarantee of test gauge accuracy to within $\frac{1}{2}$ of 1 per cent.

The sockets are made of forged steel; cases are die cast and finished in black hard rubber absolutely water-proof. The pointer is equipped with an integral micrometer adjustment so that it is very simple to compensate the gauge for water leg.

Gauges manufactured with these features by the Consolidated Ashcroft Hancock Company, Inc., are sold under the trade name Duragauge. They will outlast several ordinary commercial gauges and are unconditionally guaranteed for five years. Western Engineering Company of San Francisco is sales representative for northern California and Charles Stepan is factory representative at Los Angeles.

Arc Welded Pipe Base for Motor Generator Set

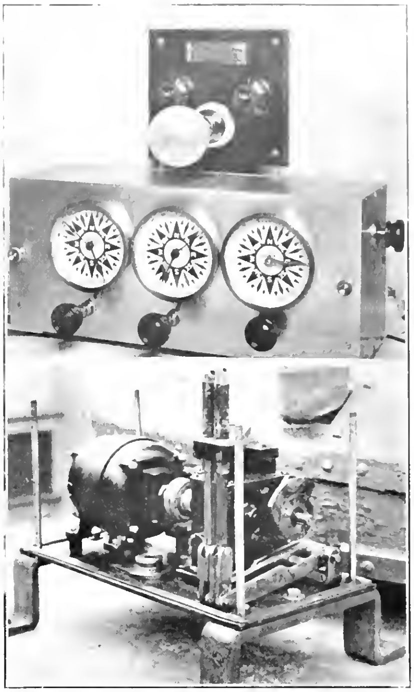
A pipe construction bed plate is employed to advantage in the small motor-generator set, illustrated here. The tubular lengthwise members especially resist tortional strains, such as those due to uneven and yielding foundations. Welded tubular designs provide stronger and more rigid structures at considerable saving in weight with added flexibility in design and reduced manufacturing time.

This set was constructed by the Westinghouse Electric and Manufacturing Company for use on a ship. The upward curving end saves space in that it allows the set to fit more closely to the curvature of the side of the ship.

Consolidation in Electrical Field. The Delco Appliance Corporation of Rochester, New York, has been mergered with the North East Appliance Corporation, manufacturer of automotive electrical equipment, according to an announcement made by E. A. Halbleib, president and general manager. The Delco Appliance Corporation manufactures and distributes Delco-Light individual electric plants, Delco electric water systems, and Delcogas individual gas units.

The Janus System—An Automatic Electrical Signalling System

THE Janus System is an automatic electric control of a steamer's whistle or siren whereby the vessel is enabled to signal her course to another passing in a fog, thus eliminating the danger of collision through a simple adherence to the "Rule of the Road." Courses in this system are indicated by the frequency of the recurrence of the prolonged blast prescribed by international and United States regulations. This blast is released automatically and continuously at intervals that are completely under the control of the transmitting apparatus in the pilot house.



(Upper) Transmitting and receiving set, for mounting in chart room or pilot house, designed for sending and receiving the Janus timed and variable toned whistle signals. (Lower) Janus set mounted ready for connection with the whistle cord.

The formula used is very simple and may be stated precisely as follows: Any course is indicated by the recurrence of a signal at a frequency equal to one minute plus the number of seconds equal to one-sixth of the course expressed in degrees of angularity. Thus a 45-degree or Northeast course would be indicated by the prolonged blast with intervals of one minute and $7\frac{1}{2}$ seconds, or a 180-degree (South) course would be indicated by intervals of one minute and 30 seconds.

In actual practice, as the apparatus is developed, the navigator does not have to think of frequencies. He merely sets his magnetic course on the transmitter dial, closes the switch, and the apparatus takes charge of the whistle. The receiving dials give the course of any Janus-equipped ship in degrees.

This system is the co-invention of two Russian navigators, Captain Robert Kamdron and Captain Geo. Stavrakov, formerly of Vladivostock, now of Seattle. The Janus System, Inc., of Seattle handles the Janus whistle throughout the American continent and also in Japan and China. This corporation is owned by well known American ship owners and operators and is under the management of Captain F. R. Nichols, former master of the steamship President Jefferson.

A special variable tone whistle has been developed for use with the Janus system; and it is the testimony of all experienced seamen who have heard the Janus whistles on installations in use on Puget Sound waters that the sound signals from these whistles are easily recognizable, have a superior fog-penetrating quality, and are entirely different in tone from other ship whistles.

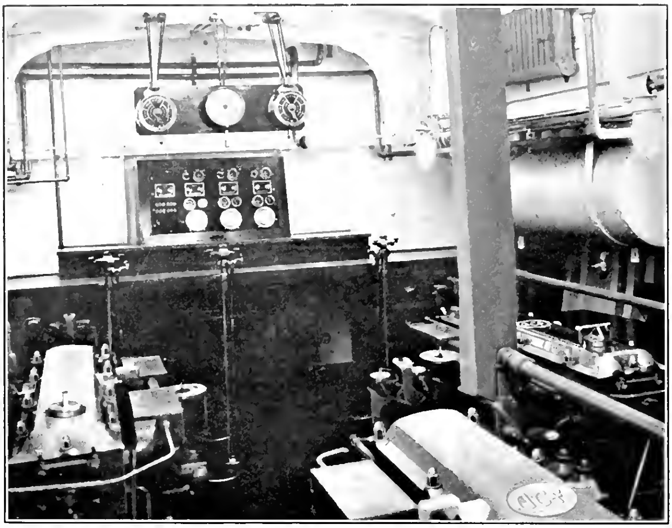
Although developed primarily for sound signalling, the Janus System may also be used to advantage in connection with wireless, radio telephone, or submarine signalling apparatus. By synchronizing the signals from any one of these systems with the Janus whistle there would be obtained a reliable measure of the distance to the signalling vessel as well as an accurate check on her bearings.

United States Coast Guard Cutter Smith

INSPIRED by the remarkable performance of the cutter Tingard, the United States Coast Guard has just outfitted a sister ship, the Smith. With exactly the same hull, but with a cruising range of 4000 miles, the Smith will attempt to surpass her forerunner as the pride of the fleet.

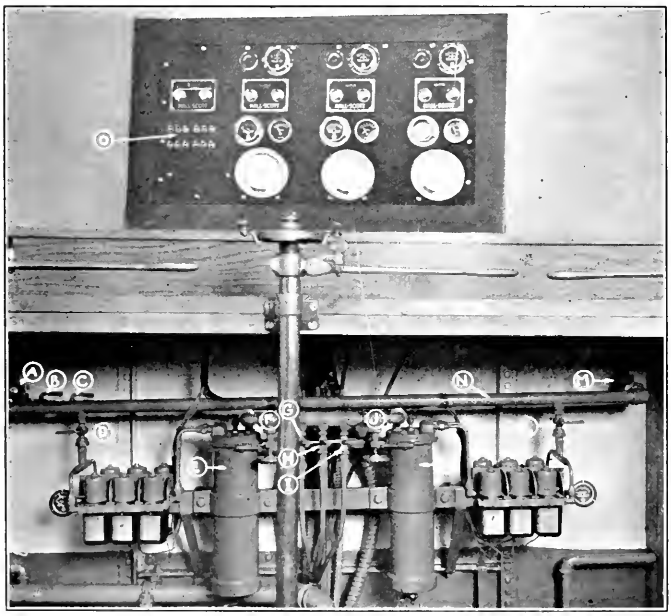
The general characteristics of the Smith are: Length, 110 feet; beam, 14 feet 8¾ inches; draft, 5 feet 11 inches, displacement, 75 tons.

As with the Tingard, she is propelled by three Hall-Scott "Explorers" rated at 175 brake horsepower but with actual delivery over 190 horsepower each. These engines develop their maximum horsepower at approximately 600 revolutions per minute of the propeller or 1800 revolutions per minute of the engine, as they are equipped with 3 to 1 reduction gears.



Engine room of U. S. Coast Guard cutter Smith.

The fuel system on the Smith is a duplicate of that on the Tingard and has been especially designed for this service. Two banks of six Autopulse units normally supply the fuel. The capacity of each bank is sufficient to feed the engines so there is a factor of safety of 100 per cent. as either bank may be shut down for repairs.



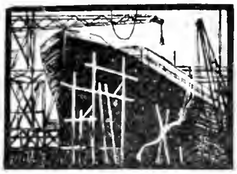
Fuel Supply system of Cutter Smith. (A) Aft port tank shut-off valve; (B) Forward port tank shut-off valve; (C) Forward starboard tank shut-off valve; (D) Port Autopulse pump suction shut-off valve; (E) Port pump gasoline strainer; (F) Port pressure valve; (G) Port engine shut-off; (H) Center engine shut-off; (I) Starboard engine shut-off valve; (J) Starboard pressure valve; (K) Starboard pump gasoline strainer; (L) Starboard Autopulse pump suction shut-off valve; (M) Gasoline suction manifold; and (N) Switches for testing pumps.

The engine room ventilation system has been carefully worked out. A B. F. Sturtevant blower, mounted directly on the center engine, provides a complete change of air in the engine room every minute with the engine at cruising speed.

For electric lighting and ventilating fans, a Kohler automatic gas engine driven generator is installed. The engine room is protected against fire by a 4-cylinder Lux installation supplied by Walter Kidde & Company through Hough & Egbert of San Francisco. The necessary alterations to the hull and the installation work were done at The Moore Dry Dock Company.

The Tingard has become the leader of the fleet due to her noteworthy performance during the past year. In that time she covered 35,000 miles with a total engine maintenance cost (for three engines) of less than fifty dollars.

The United States Coast Guard has recently granted a contract to the Gibbs Gas Engine Works of Jacksonville, Florida, for fifteen 38-foot picket boats. These are to be powered by Hall-Scott "Invaders." The "Invader" is a new model, 275-horsepower direct drive engine which has been undergoing a grueling test on the dynamometer and in the Hall-Scott test boat.



American Shipbuilding

Edited by H. C. McKinnon

New Lighthouse Tender Ordered. The Moore Dry Dock Co., Oakland, Calif., was awarded contract for the construction of the hull of the new twin-screw lighthouse tender for the Bureau of Lighthouses at San Francisco on a bid of $139,949.

Bids for the supplying the diesel engines were rejected and new bids are being requested to be opened February 17 at 2 p.m. at the Bureau of Lighthouses, Customs Building, San Francisco. The specifications call for two 240-horsepower, 350 revolutions per minute diesel engines to give the vessel a speed of 9½ knots, with alternate bids requested for pilot house control.

The tender is to be 121 ft. 4 in. over-all length, 111 ft. 8 in. at water line, 25 ft. molded beam, 9 ft. minimum depth, and 6 ft. 8 in. draft. She will be of 323 tons displacement. Accommodations will be provided for a crew of 16, including officers.

Bids Called on Cruiser CL-37. Bids from private shipyards will be opened by the Secretary of the Navy February 11 at Washington, D. C., for the construction of Light Cruiser No. 37, which is to be similar to the New Orleans being built by the New York Navy Yard. The limit of cost is set at $17,000,000 and funds are to be made available in the budget for the fiscal year 1932. Plans and specifications were prepared by the New York Navy Yard.

Bids Asked on Coronado Ferry. Bids have been asked by the Automobile Ferry Company of Coronado, Calif., for a diesel-electric vehicular ferryboat for operation on San Diego Bay between San Diego and Coronado. Plans and specifications were drawn up last spring by Lambie & Mabry, naval architects with offices in the Security First National Bank Building, Wilmington, Calif. but the request for bids have been held up pending settlement of legal hindrances to the operation of the ferry service.

The craft is to be of all-steel construction, 200 feet long, 56 feet width, 8 feet 6 inches draft, with propellers at both ends. The propulsion power is to be supplied by four diesel-electric generating sets developing about 1500 horsepower and giving a speed of 13 knots. Tenders for the machinery have already been received.

All auxiliaries are to be electrically operated; and it is reported that Oertz streamline rudders have been specified. The boat will have capacity for 80 automobiles and several hundred passengers.

Second Dollar Liner Named. The second $8,000,000 turbo-electric liner building for the Dollar Steamship Lines of San Francisco by the Newport News Shipbuildng & Drydock Company will be known as the President Coolidge. The vessel is scheduled for launching about February 21.

The vessel, which is a sister ship to the President Hoover, launched December 9 at the Newport yard, is 653 ft. in length, 81 ft. beam, 52 ft. depth, and of 33,800 tons displacement. She is to be powered with Westinghouse turbo-electric propulsion plant.

THIRD ANNUAL PACIFIC COAST BOAT SHOW is announced for March 21-March 28 at San Francisco. The show, which is conducted under the auspices of the Associated Boat Industries, Inc., of California, 417 Market Street, San Francisco, will be held as usual at the Civic Auditorium and will be the only Boat Show held on the Pacific Coast this year. It is reported that 80 per cent. of the floor space has already been reserved by exhibitors of former years and new exhibitors—and it therefore behooves all manufacturers of marine supplies and equipment, as well as motor and sailing craft, to make their plans for this Exposition.

Another Large Tuna Clipper. Al Larsen Boat Building Company, Terminal Island, San Pedro, Calif., has an order for a 105-ft. raised-deck type tuna fishing craft for the Galapagos Fishing & Transport Company to be named Margarita. The vessel is to have a beam of 25 ft. and a depth of 11.5 ft. Propulsion power will be supplied by a 275-horsepower Atlas-Imperial diesel engine; auxiliary power will be supplied by two 30-horsepower Atlas engines, connected to Westinghouse 17-kilowatt generators. These units will furnish electrical current for the refrigerating plant, Byron Jackson bait pumps and gear.

San Diego Quarantine Tug Ordered. The General Engineering & Drydock Co., with plant at Oakland, Calif., has been awarded contract by the U. S. Dept. of Public Health for an all-steel boat for use of the Quarantine Bureau at San Diego, Calif. The boat is to be 60.10 ft. long, and powered with a Winton diesel engine capable of propelling the vessel at 10½ knots. The cost is about $50,000 and construction will require 60 days.

Pilot Boat Bids Opened. Harbor Boat Building Co., Terminal Island, San Pedro, Calif., was low bidder for the construction of a diesel-powered pilot boat for the Los Angeles Harbor Department, San Pedro, opened January 7. The low bid was $51,780, but as a number of bids were submitted by each firm, final award of contract may take several weeks. The boat is to be 58 ft. 6 in. over-all length, 15 ft. beam, 7 ft. 6 in. draft, with 300-horsepower diesel to give a guaranteed speed of 15 knots.

Tunnel-Stern Vessel for Columbia River. The Harkins Transportation Company of Portland, Oregon, has placed an order with the Albina Marine Iron Works, Portland for construction of a steel, tunnel-stern, combination freight and passenger boat powered with diesel engine and equipped with an electric elevator for freight. The vessel is to be operated between Astoria and Portland. She will be 160 ft. long, 30 ft. beam, with a speed of 14 miles an hour.

Ship Construction Loan Approved. Loans totaling more than $12,000,000 were authorized January 7 by the Shipping Board for construction of the four passenger-cargo vessels for the Panama Mail Steamship Co., and the Grace Steamship Co., of San Francisco. These ships, to be constructed by the Federal Shipbuilding and Dry Dock Co. at Kearney, N. J., will be placed in service between San Francisco and New York with calls at various ports in Central and South America and at Cuba. The four vessels will be of 16,000 tons displacement, will have a maximum speed of 18.5 knots, and will be 508 feet overall. They will carry both passengers and cargo.

Small Cruiser Ordered. The Prince Rupert Drydock & Shipyard, Prince Rupert, B. C., has received an order from the Anglican Mission for a raised deck wooden cruiser for operation in northern British Columbia. The boat will be 47 ft. long, 8 ft. 6 in. depth and will be powered with high speed Gardner diesel engine of 54 horsepower connected to a single screw through 2:1 reduction gear.

Plans not yet Ready on McCormick Freighters. Angelo Conti, naval architect of New York, New York, paid a visit to the head office of the McCormick Steamship Company, 215 Market Street, San Francisco, the latter part of December relative to the plans for seven freighters for the company's extensive Pacific Coast-South American service. The vessels are to carry a limited number of passengers. Shipyards are to submit tenders on two sizes and two speeds of craft with several types of power plant.

O. & O. Plans Progressing. According to a recent statement by John E. Cushing, vice-president of the American-Hawaiian Steamship Company, San Francisco, the Oceanic & Oriental Navigation Company hopes to have well started during the year 1931 the building of four freighters required under the Post Office transpacific mail contract.

Pacific Coast shipyards, which have not been accorded the opportunity to bid on many of the new vessels built under government loans and favorable mail subventions, are to be asked to submit tenders for the construction of these four vessels.

East Coast Yard to Build Red "D" Liner. The Pusey & Jones Corp., Wilmington, Delaware, was low bidder for the construction of a passenger and freight vessel for the Atlantic & Caribbean Steam Navigation Company (Red D Line), 140 Wall St., New York, under revised specifications which were submitted only to East Coast shipyards after the rejection of the original tenders for the building of this vessel. Bids were received as follows:

Pusey & Jones Corp., $1,398,000 and 14-16 months; Sun Shipbuilding & Dry Dock Co., $1,479,000, 9 months; Tampa Shipbuilding & Engineering Co., $1,484,000, 14 months; Newport News Shipbuilding & Drydock Co., $1,600,000, 14 months; United Dry Docks, Inc., Staten Island Plant, $1,729,000, 18 months; New York Shipbuilding Co., $1,763,000, 15 months; Bethlehem Shipbuilding Corp., $1,790,000, 20 months.

The vessel is to be 348 ft. 10 in. long, 51 ft. beam, 22 ft. depth, driven by turbines geared to twin screws, giving the vessel a speed of 13 knots. Theodore E. Ferris, 30 Church Street, New York, is the designer.

Under the original call for bids for the building of this vessel, the low bid was submitted by the General Engineering & Drydock Company of San Francisco. This bid was $1,095,000 and 10 months time, which was lower than the nearest competitor by $55,000 and 3 months time. In explanation for the omission of the West Coast yards in its request for new bids the shipowners explained that "it would be more convenient to have the ship built nearby."

Senate Passes Battleship Modernization Bill. By a vote of 72 to 13, the Senate on January 16 approved for the second time the bill (S.4750) authorizing an appropriation of $30,000,000 for the modernization of the battleships New Mexico, Mississippi, and Idaho.

The Naval Affairs Committee of the House of Representatives on January 14 approved a bill for naval construction in accordance with recommendations of Chairman Britten, with the exception of an appropriation of $16,605,000 for a 7500-ton, 6-inch gun cruiser—a radically different type of cruiser from the 10,000-ton type now a part of the naval unit.

The new construction proposed in the bill (H.R. 14688) include the following:

One 6-inch gun flying deck cruiser of 10,000 tons, to cost about $20,780,000 (and capable of carrying from 25 to 40 planes);

Four submarines of 1100 tons each to cost about $4,400,000 each;

Eleven destroyers, including one destroyer leader, at a cost of $47,000,000 (already authorized but for which the appropriation has to be asked);

One plane carrier of 13,800 tons, capacity of 114 planes, to cost about $27,650,000.

Secretary of the Navy Charles Francis Adams has reported to the

Launching of the steel car ferry City of Milwaukee, built at the Manitowoc Shipbuilding Co. for the Grand Trunk Western Railroad; 360 ft. long, 56 ft. beam; 21 ft. 6 in. depth; capacity 30 loaded freight cars and 200 passengers. The ferry is powered by two 1500-horsepower triple expansion engines; and has a Kohler 5-kw., 110-volt, D.C. generating plant for auxiliary light and power.

House Committee on Naval Affairs that the immediate appropriation of funds for the modernization of at least two of the above mentioned battleships is urgent. The work is to be done at a navy yard, those at Boston, New York, Norfolk, and Philadelphia being considered.

Tenders for Canadian Survey Vessel. The British Columbia Section of the Canadian Hydrographic Survey, Victoria, B. C., received bids January 22 for a new survey vessel. She will be 214 ft. long, 37 ft. beam, 13 ft. max. draft. She is to be propelled by reciprocating engines driving twin screws to give a speed of twelve knots. Her specifications call for a complete survey equipment including echo sounding machine, Lucas sounding machines, and radio acoustic position finder. She will carry four gasoline launches propelled by 25-horsepower Thorneycroft engines, three small outboard motors, two lifeboats, three dinghies for sweeping, and six dories for surf landings. All boats will be handled by Welin-MacLachlan automatic type davits. Navigating equipment specified includes wireless direction finder, gyro-compass, and telemotor. She will carry a complete wireless equipment for navigating and survey work.

To Recondition 11 Vessels.—The Moore & McCormack Co., 5 Broadway, New York, (operator of the American Scantic Line of freighters, has prepared plans and specifications for the reconditioning of 11 vessels of this line for the accommodation of 50 passengers each. Plans are now awaiting approval of the Navy Department and the Postoffice Department, as the work will be done under a government loan.

These vessels have a length of 390 ft., 53 ft. beam, and 27.6 ft. depth, and are of 7840 tons deadweight carrying capacity. The reconditioning for the addition of accommodations for passengers will entail the filling in of the forward and after wells and the raising of the forecastle. A new lounge and dining room will be provided on the boat deck, and the bridge deck houses will be made continuous. The vessels are propelled by General Electric steam turbines, steam being supplied by Babcock & Wilcox boilers.

Todd Receives Two Contracts.—The Todd Dry Dock, Engineering & Repair Corp., Brooklyn, N.Y., was awarded contract by the New York City Dept. of Plant and Structure for two double-ended ferryboats to cost $774,620. The vessels will be duplicates of the steamer Melrose, 151 ft. long, 53 ft. breadth over guards, 36 ft. 7 in. molded beam, 14 ft. 3 in. depth. Two 850-horsepower vertical compound engines will provide propulsion power.

This yard also was awarded contract by the Fire Commissioner of the City of New York for a fireboat to cost $582,500. The craft will be 130 ft. long, 26 ft. beam, 7 ft. 6 in. draft, and will be driven by five gasoline engines developing 2750 horsepower. Plans were drawn up by the firm of Henry J. Gielow, Inc., 25 West 43rd Street, New York.

Repair Awards.—Todd Dry Docks, Inc., Harbor Island, Seattle, was recently awarded contract for repairs to the Matson Line freighter Maliko, damaged by fire while moored at the Union Pacific Dock, Seattle, loading cargo. Todd submitted low bid of $44,600 for the work, on which tenders were received from six Pacific Coast yards.

This plant has just completed dry-docking and general overhaul to the entire fleet of the Gulf Pacific-Redwood Line at a cost of about $100,000.

Forty Barges Ordered. The Inland Waterways Corp., Washington, D. C., has placed contracts for 40 barges at a total cost of $2,548,-800. The contracts were awarded as follows:

Marietta Manufacturing Co., Point Pleasant, W. Va., 5 barges.

Midland Barge Co., Midland, Pa., 5 barges.

Ingalls Manufacturing Co., Birmingham, Ala., 5 barges.

Alabama Dry Dock Co., Mobile, Ala., 5 barges.

All of the above are for Design No. 1 at a price of $59,780 each. They are to be 230 by 48 by 11 ft. dimensions, with steel cargo houses.

McClintic Marshall Co., Pittsburgh, Pa., 10 barges.

American Bridge Co., Ambridge, Pa., 10 barges.

The above two orders cover Design No. 3 and are to cost $67,560 each. They are to be of dimensions 300 by 48 by 11 feet.

The Third Lurline.—The third new $8,000,000 liner to be built for the Matson Navigation Company will be christened the steamship Lurline, according to announcement from the company's executive offices at San Francisco. The new steamer will be a sister ship of the steamship Mariposa and the Monterey, now nearing completion at the Bethlehem plant at Fore River, Mass. Regard for the historic past and a desire to perpetuate the memory of San Francisco's early waterfront activities are seen in the choice of the name Lurline. The vessel will be the third of a noble line of San Francisco ships to bear that historic name.

Lurline, the third, like her sister ships Mariposa and Monterey, will be 632 feet long, 79 feet wide, and displace 25,885 tons. Accommodations will be provided for approximately 800 passengers. Work on the Lurline will commence as soon as the Mariposa is off the ways the latter part of this year. She is scheduled for completion early in 1933.

Steam-Driven Towboat. Howard Shipyards & Dock Company, Jeffersonville, Ind., has an order from the Inland Waterways Corp., Washington, D. C. for a steam-driven, oil-burning towboat to be 196 ft. over-all, 42 ft. beam, 6 ft. molded depth. She will have 1000-H.P. compound condensing engine and will cost $135,663 without propulsion equipment

Steel Harbor Tugboat. The Pusey & Jones Corp., Wilmington, Del., has recently been awarded contract by The Chesapeake & Ohio Railway Co. for a steel harbor tugboat to be 102 ft. 6 in. between perpendiculars, 10 ft. 6 in. loaded draft. The craft is to have 1000 indicated horsepower steam engine, steam to be supplied by one Scotch boiler, 16 by 12 ft. dimensions and of 160 pounds working pressure.

Dredge and barges ordered. Nashville Bridge Co., Nashville, Tenn., has received an order from the Sternberg Dredging Company for a dredge, dimensions 150 by 50 by 7 ft. 10 in. This yard also has an order from the Bedford-Nugent Co. for two barges 100 by 28 by 7 ft. 3 in. Keels for all three craft will be laid in March.

Steel Barges Ordered. Bethlehem Shipbuilding Corp., Ltd., Baltimore, Md., has an order from the Arundel Corp. for a steel barge of 240 gross tons; also an order for two steel barges of 540 gross tons for the Western Maryland Railway Co.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of January 1, 1931

Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd.
Union Plant, San Francisco

Hull 5347, steel barge for Young Bros., Ltd., Honolulu, Hawaii; 175x44x11 ft.; keel 2/20/31 est.

Hull 5348, same as above; keel 2/20/31 est.

Not named, hull 5349, steel tug for Young Bros., Ltd., Honolulu; 129'3" L.O.A.; 28 beam; 15 draft; Fairbanks-Morse 750 I.H.P. diesel engs.; keel 2/25/31 est.

Hull 5350, pineapple barge for Inter-Island Steam Navigation Co., Honolulu; 175 x 44 x 11 ft.; keel 3/2/31 est.; launch 4/21/31 est.; deliver 5/1/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30; launch 3/1/31 est.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

Shoshone, No. 24, diesel-electric cutter for U.S. Coast Guard; 250x42x15 ft.; Westinghouse turbines and motors; 3000 S.H.P.; keel 3/15/30; launched 9/11/30.

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.

JOHNSON SHIPBUILDING CO.
329 Willow Street, Seattle, Wash.

Purchasing Agent: Geo. H. McAteer.

Job 63, one heavy framed pile puller, K.D., for Alaska Pacific Salmon Corp.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

C.N. No. 109, hull 36, steel car barge for Canadian National Railways; 279 L.B.P.; 42 beam; 12'3" depth; cap. 17 loaded freight cars; 3 tracks; 2 st. capstans, anchor windlass; keel 7/31/30; **launched 12/9/30; delivered 12/21/30.**

Twelve wooden lifeboats for Canadian National Steamships, Ltd.; 28x8'6"x3'6"; deliver Dec.-Jan.

Not named, vee-bottom wooden pleasure cruiser for L. W. Kengin, Prince Rupert; 34 L.B.P.; 8 beam; 2'9" depth; 10 knots speed; 34-B.H.P. Redwing eng.; keel 11/1/30.

Bobolink, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink; keel 12/8/30; deliver 3/8/31 est.

Not named, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8'6" molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; keel 1/15/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Louisville, light cruiser CL-28 for United States Navy; 10,000 tons displacement; keel July 4/28; launched 9/1/30; deliver Mar. 13/31 est.

Astoria, light cruiser CL-34, same as above; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

Chicago, light cruiser CL-29 for United States Navy; 10,000 tons displacement; launched 4/10/30; deliver 3/13/31 est.

V-6, submarine SC-2 for U. S. Navy; launched 3/15/30; deliver 9/10/30 est.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, paint, misc. repairs: Silverfir, City of Los Angeles, Lio, Tamaha, Camina, Robert Luckenbach, Napa Valley, Tamiahua, El Segundo, H. T. Harper, California, Idaho, Nyhorn, Sonoma, San Mateo, barge Los Angeles, tug A. E. Williams, Governor Stephens, dredge Major Tilden, str. Esther Johnson, W. S. Miller, H. T. Haper, Malolo, tug Standard No. 1, dredge Trojan, barge Mono. Misc. repairs: Otokai, J. C. Fitzsimmons, Charcas, Cathwood, Paul Shoup, Dilworth, Greenland, Ruth Alexander, President Harrison, Rainbow, Patriotic, Geneve, New Monterey, Caliche, General Smuts, Medusa, San Leonardo, La Purisima, Susan V. Luckenbach, Nora, Sommerstad, Brilliant, Lansing, whaler Hercules, Willapa, Golden Coast, San Jose, Bolivar, President Madison, H. T. Harper, Chehalis, Monowai, Suriname, dredges A. MacKenzie, San Pablo.

THE MOORE DRY DOCK CO.,
Oakland, Calif.

Drydock for survey, hull damage repairs: Eureka. Drydock for general hull repairs: Dauntless. Drydock, paint, misc. repairs: Hoquiam. Oregonian (engine dept. repairs). Vacuoline (voyage repairs). Hawaiian (drew tailshaft, install spare shaft, rewood stern bearing, renew gland bushing, caulk rivets). Plow City (deck and engine dept. repairs). Western Union Barge, ferry Golden State (also hull repairs and caulking). Maunawili (caulk, weld, and renew misc. rivets, overhaul sea valves). West Ivis (misc. eng. & deck repairs). Lincoln Ellsworth (caulking shell rivets, drew tailshaft for examination). Golden Sun, California, Cahokia (rudder repairs). Jefferson Myers (survey and repairs to damaged bow and stern, misc. engine and deck repairs). Sea Foam (renew hawse pipe, sections of shoe, fenders; installed graving pieces in hull), Willboro, Annie Christenson (change propeller), Willpolo, (caulk shell rivets), Stuart Dollar (caulk shell rivets and seams, and renewal of rudder gudgeon bushings). Monoa (rivets and seam caulked in shell, overhaul sea valves, ranged anchor chains), Arizonian (overhaul sea valves, caulk misc. rivets and seam), Davenport (unshipped rudder, caulked rudder trunk also other seams and butts, installed graving pieces, caulk deck, misc. eng. dept. repairs). Drydock for survey: Redline. Drydock, forge and machine and install new upper rudder stock: W. P. Barge No. 3.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Overhaul and misc. repairs: Prince William. Port side scaled, misc. overhaul and repairs: Canadian Winner. Overhaul and misc. minor repairs: Canadian Ranger. Port and starboard sides amidships closed in: Prince Charles. Docked for carpenter repairs and renewals: barge Griff. Dock, clean, paint, misc. repairs: 1 scow, 1 fish boat. Misc. hull and engine repairs not requiring docking: 29 fish boats.

TODD DRY DOCKS, Inc., Seattle, Wn.

Misc. overhauling: C.S.c. Chelan. General repairs: Contra Costa. New stern frame and misc. repairs: Northwestern. Voyage repairs: President Jackson. Misc. repairs: Alamar, Coya, Dio, James Griffiths, Forbest Hauptman, Point Bonita, Sabotaway.

U. S. NAVY YARD, Bremerton, Wn.

Misc. repairs and docking: Lexington, Twiggs, Greer, Neches. Misc. repairs not requiring docking: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x26x11 ft.; 5 delivered July/30.

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; keel 1/1/31 est.; deliver 3/31 est.

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named; 168 L.B.P.; 26 beam; 9 draft; twin Winton diesel engs.; 1600 I.H.P.

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launch 4/10/31 est.

Aras, hull 139, diesel yacht, Hugh J. Chisholm, 243'9" L.O.A. 227'3" L.W.L.; 36 beam; 21'7" depth; 2 Winton 1100 B.H.P. diesel engs.; keel 5/19/30; **launched 12/8/30;** deliver 1/15/31 est.

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30; launch 4/15/31 est.; deliver 4/25/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30, launch 6/20/31 est.; deliver 8/10/31 est.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B.H.P. Fairbanks Morse diesel eng.; keel 10/15/'30; launch 3/20/31 est.; deliver 4/25/31 est.

Maine, hull 143, sister to above; keel 10/18/'30; launch 3/20/31 est.; deliver 4/25/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30.

Delecta, hull 145, diesel-electric yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft, 14 knots speed; two 400-H.P. diesel engs.; keel 1/10/31 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Borinquen, hull 1432, steel passenger vessel for New York and Porto Rico Steamship Co.; 7050 gross tons; keel 1/20/30; launched 9/24/30; deliver Jan. 1/31 est.

Virginia Sinclair, hull 1438, steel tanker for Sinclair Navigation Co.; 6400 gross tons; launched 10/9/30.

Harry F. Sinclair, hull 1439, sister to above; **launched 11/24/29.**

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above,

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hulls 4268-4273, six steel oil barges for Lake Transport Corp.; 4271 launched 5/22/30; 4270 launched 6/20/30; 4272 launched 6/27/30; 4268 launched 7/20/30; 4273 launched 9/10/30.

Hull 4274, steel carfloat for Central R.R. of New Jersey; launched 9/26/30.

Hulls 4275-4276, two steel barges for Merchant & Miners Transp. Co.; launched 7/24/30.

Hulls 4277-4278, two steel barges for Baltimore and Ohio R.R.; launched 9/19-9/29/30.

Not named, hull 4280, steel oil tanker for Gulf Refining Co.

Not named, hull 4281, same as above.

Hull 4283, steel barge for The Arundel Corp.

Hull 4284, steel barges for Western Maryland Railway Co.

Hull 4285, same as above.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel ferryboat for the Seaboard Air Line, 65 x 22 ft., 120 H.P. Fairbanks Morse eng.

One all-welded steel yacht, owner not named.

COLLINGWOOD SHIPYARDS, Ltd.
Collingwood, Ontario.

Purchasing Agent. E. Podmore.

Hull 86, lock gate lifter for Dept. of Railways and Canals of Canada (Welland Canal); 90 by 66 by 26 ft.; designed to lift gates weighing 500 short tons; keel 12/28/29; launched 10/7/30, **delivered 11/5/30.**

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2962, 80-ft. cruiser for J. T. McMillan, Detroit, 2 300 H.P. Speedway engines.

Hull 2994, 81-foot commuter boat for N. B. Woolworth; 2 300-H.P. Speedway engines.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Not named, hull 145, steel yacht, owner not named; 108 L.B.P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30.

Not named, hull 146, steel yacht, owner not named; 126 L.B.P.; 18 beam; 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30 est.

Not named, hull 147, steel yacht for E. S. Close, Toledo; 106 L.B.P.; 17'6" beam; 6 loaded draft; 14 M.P.H.; 98 D.W.T.; 300 I.H.P. diesel eng.; keel 11/25/30 est.; launch 4/15/31 est.; deliver 5/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1046 to 1055 incl., 10 standard stock barges 100x26x6'6"; **8 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hulls 1064-1065, two 50-ton whirler derrick boats for New York Central Railroad.

Hulls 1067-1072 incl., six misc. cargo barges for stock; 130x30x8'6".

Hull 1073, 15-ton derrick boat for U.S. Engineers Office, Pittsburgh.

Hulls 1074-1083 incl., 10 hopper type steel coal barges for stock.

Hull 1084, 50-ton whirler derrick boat for Erie Railroad Co.

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent. R. S. Page

Hull 119, steel harbor barge for stock; 175x36x12'7-1/8"; keel 5/19/30.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent. W. H. Dickey.

One steel wharf barge for City of Rock Island, Ill.; 230x45x7'9"; launched 11/3/30; deliver 1/15/31 est.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; keel 2/15/30 est.; launch 3/15/31 est.; deliver 4/15/31 est.

One towboat for Inland Waterways Corp., W[illegible] D.C. [illegible] ed [illegible] 6 molded depth [illegible] H.P. [illegible] condensing eng.

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer

Hull 261, car ferry for Milwaukee Ferry Co. (Grand Trunk R.R.); 343x56x21'6"; 14 mi. speed; 2200 D.W.T.; 2 recip. steam engs.; 3600 S.H.P.; 4 Scotch boilers, 14'6" x 12'; keel 7/12/30; launched 11/25/30; deliver 1/15/31 est.

Not named, hull 268, steel tug, for Great Lakes Dredge & Dock Co., 115 x 26 x 15 ft.; one Babcock & Wilcox boiler, 850 H.P. turbine with reduction gear, keel 1/31 est.; deliver 5/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S. Engineering Office, New Orleans; 65'6"x17'x7'1½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

All-welded steel barge for Inland Waterways Corp., 1016 Munitions Bldg., Washington, D.C.; 230 length on deck; 45 ft. molded beam; 11 ft. molded depth, keel laid.

Steel oil tanker for Victor Lynn Transportation Co.; 210 gro. tons; keel 12/30.

Two barges for E. T. Slider, 120x30x7'6".

Ten barges for U. S. Engineers, Rock Island, Ill.; 110x24x5 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 240, deck barge for Bedford Nugent Co.; 100x26x6'6"; keel 8/15/30; launched 9/17/30.

Hull 241, same as above; keel 8/28/30; launched 9/26/30.

Hull 242, same as above; keel 8/30/30; launched 10/1/30.

Hull 243, same as above; keel 9/4/30; launched 10/6/30.

Hull 244, deck barge for stock; 100x26x6'6"; keel 10/20/30; **launched 12/4/30.**

Hull 245, same as above; keel 11/6/30.

Hull 246, same as above; keel 11/13/30.

Hull 247, same as above; keel 11/16/30.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; **keel 1/12/31.**

Hull 249, same as above.

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; keel 3/12/31 est.; launch 4/7/31 est.

Hull 251, deck barge for Bedford-Nugent Co.; 110x28x7'3" depth; keel 3/2/31 est.; launch 3/16/31 est.

Hull 252, same as above; keel 3/9/31 est.; launch 3/23/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 233 Broadway, New York City.

Augusta, hull 324, light cruiser CL-31 for United States Navy; 10,000 tons displacement; keel July 2/28; launched 2/1/30; deliver Mar. 13/31 est.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel

3 25 30; launched 12 9 30; deliver 8 31 est.

Not named, hull 340, sister to above; keel 4 22 30; launch 2 21 31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.: 56'6" beam; 26'6" depth; geared turbine drive, $19\frac{1}{2}$ knots speed; keel 9 2 30, launch 3 31 est.; deliver June 31 est.

Not named, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; $17\frac{1}{2}$ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/31 est.; launch 9 31 est. deliver 1/32 est.

Not named, hull 345, sister to above; keel 3 31 est.; launch 11/31 est.; deliver 4/32 est.

Not named, hull 346, sister to above; keel 5/31 est.; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Excalibur, hull 394, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 11/4/29; launched 8 5 30; **delivered 12/15/30.**

Exochorda, hull 395, sister to above; keel 11/25/29, launched 10/18/30; deliver 1/15/31 est.

Exeter, hull 396, sister to above; keel 8/11/30; launch 3/1/31 est.

Excambion, hull 397, sister to above; keel 10/25/30; launch 8/1/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel spring/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Hull 1046, four diesel-electric, single-screw, harbor tugs for Erie Railroad Co.; 96 L.B.P.; 26 beam; 13'9" molded depth; 1000 H.P. diesel-electric prop.; delivery 8 months; keels 3/27/30; launched Cleveland (No. 1) 7/24/30; delivered 10/23/30; Rochester (No. 2) 7/30/30; No. 3, Scranton, launched 10/4/30; **delivered 12 15/30;** No. 4, Olean, launched 10/8/30; **deliver 12/15/30.**

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; deliver 3/15/31 est.

Onika, hull 1048, twin screw diesel houseboat for Edsel B. Ford, Detroit; 125 L.O.A.; 22 beam; 4'6" draft; two 250-H.P. diesel engs.; keel 6/21/30; launched 11/20/30; **delivered 12/30/30.**

Not named, hull 1049, two steel, single-screw, harbor tugs for stock; 92 L.B.P.; 23 beam; 12'6" loaded draft; steam eng. 1 Scotch boiler.

Not named, hull 1050, same as above.

Not named, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Northern Sun, hull 131, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 7/15/30; launch 1/20/31 est.; deliver 1/10/31 est.

Not named, hull 132, sister to above; keel 8/21/30; launch spring/31 est.

Not named, hull 133, sister to above; keel 9/17/30; launch spring/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Comet, hull 128, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 5 17 30; **delivered 12 31/30.**

Daylight, hull 137, sister to above; keel 11/13/30.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/1/31 est.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3220 I.H.P.; 2 W.T. boilers; keel 3/2/31 est.; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 1/15/31 est.; launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Louisiana, hull 85, turbo-electric, twin-screw, tunnel towboat for Mississippi Valley Barge Line Co., St. Louis; 200x40x10'6"; keel 11/28/29; launch 10/8/30; **delivered 12/19/30.**

Scott, hull No. 85, diesel-electric sternwheel towboat for U. S. Army Engineers, Rock Island & Huntington Districts; 90x 20x4'6" molded dimensions; keel 5/26/30; launched 9/6/30; **delivered 12/7/30.**

Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30.

Vesta, hull 89, sister to above; keel 10/9/30.

Yacht Building a Major Industry

YACHT building in the United States within the past few years has assumed such proportions that it can be classed as one of the country's major industries, according to Joseph A. MacDonald, president of Henry J. Gielow, Inc., naval architects, of New York. There were $20,000,000 worth of private, custom-built boats already in service last year and ordered from American shipyards.

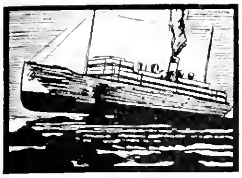
In the city of Bath, Maine, the Bath Iron Works, specialists in yacht building, employ as high as 1400 men at one time and keep an average of more than 1000 men busy at all times. The population of Bath is about 14,000 persons, and it is estimated that every family in that city and many in adjacent cities are benefited by the employment of these men.

Orders amounting to $7,000,000 were placed in Bath in 1930 for the construction of private yachts and the next seven months will see an equal sum sent there for completion of yachts now under way or ordered. Of this cost, nearly 80 per cent. goes for labor.

It is further stated that every state in the union participates in yacht building. Some supply labor, some materials, some technical skill, and some man-power for operation of the boats. There are seventy-three trades employed in assembling a single boat; and the materials, labor, transportation, machinery, and equipment are drawn from Arizona, Mississippi, Montana, Vermont, and forty-four other states. Aside from the laborers actually employed in the shipyards, there are a list of artisans serving as contributing factors toward the construction of yachts, such as: Railroad employees, steel workers, paint manufacturers, instrument designers, copper workers, cabinet and furniture builders, foundry employees in engine shops, rug weavers, china molders, electricians, and even hemp beaters.

Once the yacht is placed in commission, it draws a crew which is clothed, fed, housed, and paid throughout all or a greater part of the year. The fleet of 5000 boats, at the present time, employs nearly 25,000 men; and those men continuously draw upon various merchants for supplies. The yacht itself receives periodic service in shipyards and again gives employment to men who repaint, dry-dock, overhaul, and refit her whenever the occasion arises.

The U. S. Navy Yard, Bremerton, Wash., was low bidder at $24,312 for repairs to the lighthouse tender Heather, connected with the Portland Lighthouse District. Todd Dry Docks, Inc., Seattle, bid $39,667 for the work.



Marine Insurance

Edited by James A. Quinby

The Fire Coverage

What Fire Protection is Afforded by Your Marine Policy?

COVERAGE against fire is found in the body of the ordinary marine policy in the ollowing words:

"Touching the adventures and perils which the said company is content to bear and does take upon itself; they are of the seas, fires, pirates, rovers,"

From the earliest times, it has een conceded that such coverage ıcludes damage from fire caused y lightning, action of the enemy, r by negligence of the servants f the assured. It does not, howver, include damage from sponıneous combustion originating in ıe goods insured, although the wners of other and separate goods,) which such a fire has spread, ıay recover under their policies.

> ### *Economy*
>
> When you get apologetic notes in place of dividends
> And the boys is sellin' apples and a'livin' off their friends—
> When the spectre of depression trims your margin mighty thin,
> And you try to cut what's goin' out to meet what's comin' in,
> You can buy a cheaper grade of almost anything you use—
> You can smoke a cheaper cigarette and walk on cheaper shoes,
> But if you wanta stay in business and keep on sawin' wood,
> You gotta have insurance and it's gotta be good.
>
> J. A. Q.

The difficulty, in the case of spontaneous fires, is ne of proof. Most of the evidence is usually destroyd and as a practical result, the underwriter is inlined to pay the loss. In some cases, however, the pontaneous nature of the fire is so apparent, as where full cargo of coal becomes heated and burns from the enter outward, that the owner of the offending cargo s denied recovery under his policy and may even be enied allowance in general average. (See Pirie vs. Iiddle Dock Co., 4 Asp. 388). As said by Lord Ellenorough in Boyd vs. Dubois, 3 Campbell 133, "If the emp was put on board in a state liable to effervesce nd generate the fire which consumed it, upon the ommon principle of insurance law the assured canot recover for a loss which he has himself occasiond."

Other Causes Covered

With the single exception of inherent vice, all inentional as well as nonintentional fires are covered, f we rule out deliberate arson by the assured. In an arly case (Gordon vs. Rimmington, 1807, 1 Campbell 23) the commissions of a master of a merchant vessel ıad been insured under the ordinary marine policy. To revent capture by a French privateer, the master and rew burned the ship. The loss was held to be covered y the policy.

Similarly, in Bush vs. Royal Exchange, 1818, 2 B. Ald. 73, the loss arose from the negligence of the mate, who started a fire on board and failed to see that it was properly extinguished. The court held the loss covered by the hull policy, since the proximate cause was fire, one of the perils expressly enumerated in the contract, while the negligence of the mate was merely a remote cause.

In the modern case of The Companion, 1929 A.M.C. 693, the captain of a fishing vessel negligently used a can of gasoline to start a fire in the cabin heater, with the usual result. An attempt was made by the underwriters to escape liability upon the theory that the vessel was unseaworthy by reason of having the can of gasoline on board, but the loss was held covered by the policy.

The determination of the proximate or controlling cause of loss is not always easy. In Howard Fire Ins. Co. vs. Norwich and New York Transportation Co., 79 U.S. 194, a vessel suffered damage below the waterline by collision. If no further casualty had resulted, the cargo enclosed in her upper works would have kept her afloat. When the water reached the firebox, however, steam scattered the fire, which was communicated to her superstructure, consuming the latter and the cargo. The vessel then sank. Certain underwriters had insured the ship against fire only, the risk of collision remaining with the owner. In a suit upon the policies, the Supreme Court held that the additional cost of raising and repairing, over and above the amount which would have been involved had no fire occurred, was recoverable under the policies.

The inclusion of the specific word "fire" in the body of the policy makes it necessary to inquire in any given case whether the riders attached to the policy conflict with or eliminate the fire coverage. In the case of the Daniel v. Dugan, 1927 A.M.C. 133, the Institute Time Clauses (which contain no specific fire coverage) were affixed to an ordinary hull policy, with the clause:

"The terms and conditions of this form are to be regarded as substituted for those of the policy to which it is attached, the latter being hereby waived."

The vessel was damaged by fire, and the underwriter denied liability on the ground that the fire coverage was waived by the above clause. The District Court denied recovery to the assured, but the Circuit Court of Appeals (See 1928 A.M.C. 492) reversed the decision and allowed a reformation of the policy on the ground that the parties actually intended to cover the risk of fire.

Smoke

While reported cases on smoke or chemical damage are few and far between, it would appear that an insurer against fire covers these natural results of fire or attempts to extinguish fire. Winter, in his work on Marine Insurance, p. 145, writes:

"The underwriter is liable not only for the actual cargo or particular part of the vessel destroyed by fire, but is also liable for consequential losses resulting from fire. Thus the underwriter assumes responsibility for damage caused by water or steam used in the hold of a vessel in an endeavor to smother the fire, or by the action of smoke damaging cargo not touched by the fire, or penetrating other holds not involved in the fire. The underwriter is also liable for the action of chemicals or gases used in an endeavor to smother the fire, as in the case of some of the patent fire extinguishers with which vessels are equipped."

Gow on Marine Insurance, p. 105, remarks that "underwriters have lately had some examples of claims for damage done to delicate articles like flour by smoke arising from accidental fires occurring on board Atlantic steamers, or resulting from measures taken to extinguish such fires . . . . It may be suggested that . . . . the principle on which liability would be determined would be akin to that adopted in the decision of Montoya vs. London Assurance."

The reader will doubtless recall that the Montoya case held that hides tainted by the presence of sea water in the vessel were covered by the sea perils clause. It seems, therefore, that Gow and Winter agree as to the coverage for smoke damage.

This phase of the subject is of peculiar interest to Pacific Coast cargo owners and underwriters at the present time. In the recent Malika fire at Seattle, numerous items of cargo were on the dock awaiting shipment. Certain of this cargo suffered damage by smoke from the fire on board the vessel. If the cargo policies bore the Warehouse to Warehouse clause, and the goods were within the geographical and chronological transit limited by that clause, we have no doubt that the damage is such as to base a liability under the fire coverage of the cargo policy.

Crew Member Denied Salvage

SALVAGE awards are customarily made to persons whose meritorious services result in saving property at sea. Passengers and members of a crew, however, are not entitled to reward for efforts made to save their own vessel, the assumption in such cases being that they merely acted in accord with their contract of employment, or to save their own lives.

The recent case of Finch vs. steamship Tashmoo, decided by the U. S. District Court for the Eastern District of New York, bears upon a peculiar angle of this exception. The libelant Finch joined the ship as an assistant steward and was performing the duties incident to that rating at the time the Tashmoo became disabled between San Pedro and the Canal. There was no wireless operator aboard and the wireless apparatus was not in working order.

Under direction of the master, Finch left his duties and worked for two days and nights, at some risk and danger to himself, and finally succeeded in connecting up the radio. He then sent a message for help, which was received by the tanker Hadnot. If he had not, the Hadnot would not—Oh, well, anyway, he did a good piece of work.

His libel for salvage was dismissed, the court holding that he was bound to obey the lawful orders of the master and, further, that his relation to the vessel precluded the making of a salvage award to him.

Shipowner Liable in Fire Case

THE decision of the Circuit Court of Appeals for the Fourth Circuit in the case of The Pinellas, 1930 A.M.C. 1875, indicates that the so-called Fire Statute, relieving a shipowner from liability for fire which does not result from his personal fault or neglect, is not an infallible defense.

The suit arose out of a fire aboard the United States Shipping Board Steamer Pinellas at Charleston in 1921, and, as is unfortunately customary in such matters, the litigation has been going on quite merrily ever since. Some of the damage was due to fire and some to water and steam used in extinguishing the blaze. The owner claimed exemption under the Fire Act (R. S. 4282) and also under the Harter Act, alleging that the improper filling of the fuel tanks, one of the causes of the fire, constituted an error in management of the vessel. The shipowner further claimed a right to contribution in general average by virtue of the Jason Clause in his bills of lading.

The cargo owners charged that the loss was due to the unseaworthiness of the vessel in her construction and personnel, both of which were directly due to the neglect of the owner, and not only claimed damages for their loss of cargo, but denied liability for salvage and general average contribution.

The trial court found that the vessel had been laid up before her disastrous voyage and, when her master joined her, had no crew aboard. While loading at Savannah for a voyage to Liverpool, a strike occurred, and she was unable to ship a proper complement of engineers. She was towed to Charleston and completed loading her cargo. About three days before the fire, the strike ended, and a chief engineer and three assistants were hired. These engineers, however, did not have the proper papers for their respective positions and were negligent and incompetent in refueling the ship. Too high a pressure was put on the tanks, causing an elbow in the fuel line to break. The oil came into contact with a lantern or some hot machinery, and the fire resulted. It also appeared that the ventpipes were not of the required size, and that this improper construction was a contributing cause of the fire.

Owners responsible for incompetent engineer

In affirming the District Court and holding for the cargo owner on all counts, the appellate court discusses these facts in the following terms:

"The District Court was of the opinion that the ship was unseaworthy both because of the defective construction of the vents in the fueling system, and also because of the incompetence of the engineers, and held that in both respects, the owners were negligent and, therefore, not entitled to the benefits of the fire statute. The owners contend that even if the ship was unseaworthy, the evidence does not show that they were personally negligent in this respect, because the ship was built by an experienced and competent builder and was passed by official surveyors of the American Bureau of Shipping as being seaworthy in all respects; and it is pointed out that in such well known cases as Walker vs. Transportation Co., 70 U. S. 150, 153, and Strathdon, 89 Fed. 374, it was held that the neglect which deprives the shipowner of the protection of the fire statute is his personal neglect and not merely the neglect of his officers or agents in charge of the ship. But in each of these cases, there was no showing that the ship was unseaworthy at the beginning. The negligent conduct complained of took place during the course of the voyage. There is authority for the rule that even if the owner is not guilty of negligence personally, the statute does not bar recovery against the ship if she was unseaworthy at the beginning of the voyage by reason of the negligence of the owners' employees. It is said that the implied warranty of seaworthiness applies to every contract of affreightment and imposes upon the owner the duty of furnishing a seaworthy ship which may not be delegated by him to any one else. See the Etna Maru, 1929 A.M.C. 1119, 33 F. (2d) 232 (5 CCA).

We are not disposed to criticize the rule laid down in this case, but it is not necessary to go to this length in order to find ample ground upon which to sustain the decision of the District Court. The shipowner does not contend, and indeed there is no basis for the contention on the evidence in this case, that the employment of the engineering force was not the personal act of the owner of the ship. The Pinellas was the property of the Shipping Board and was being operated for the owner by the Carolina Company, whose president employed the engineers in question. He was a managing officer of the operating agent, and his neglect was the neglect of the owner under the rule laid down in No. 75; Standard Wholesale Phosphate & Acid Works vs. Chesapeake Lighterage & Towing Co., 1927 A.M.C. 225, 16 F. (2d) 765. It is a sufficient answer to the shipowner's contention in this case that it was personally negligent in the employment of an incompetent crew, and that this neglect was a contributing cause to the fire which damaged the cargo. See Poleric, Bank Line vs. Porter, 1928 A.M.C. 761, 25 F (2d) 843.

Harter Act No Defense

The conclusions announced also dispose of the defense of the shipowner based upon Section 3 of the Harter Act, 46 Mason's U.S. Code, 192, which provides, amongst other things, that if a shipowner shall exercise due diligence to make his vessel in all respects seaworthy and properly manned, he will not be held responsible for damages or loss resulting from faults or errors in navigation or in the management of the vessel. Such diligence was not exercised in this case and the statute affords the shipowner no protection. For a similar reason, the shipowner is not entitled to general average contribution as claimed in the cross-libel. The so-called Jason clause, found in the bills of lading in this case, requires that the owner of the ship shall have exercised due diligence to make the ship in all respects seaworthy and properly manned in order that the cargo shall contribute in general average with the shipowner".

UNDERWRITERS HEAR THESE LECTURES

Members of the Study Class of the Association of Marine Underwriters of San Francisco at their meeting of December 15 were addressed by James Walsh of the Fireman's Fund Insurance Company and Walter Hays of the Adjusting Department of Marsh & McLennan-J. B. F. Davis & Sons.

Mr. Walsh, who joined the Loss Department of the Fireman's Fund from the New York office of the Insurance Company of North America, delivered a brief but comprehensive dissertation upon particular average losses under cargo policies. He prefaced his remarks by outlining the perils insured against and gave a graphic description of the method of ascertaining the amount due for a partial loss under a cargo policy, pointing out the distinction between the so-called "salvage loss" method, under which the underwriter pays a total loss and takes over the damaged property, and the particular average method which consists in comparing the cargo's sound and damaged values to obtain the percentage of depreciation, and then applying this percentage to the insured value.

Mr. Hays, the second speaker of the evening, was well known to the members of the class, several of whom have attended his lectures on Marine Insurance given under the auspices of the University of California Extension Division. His subject was "The Rights of Salvors," and he handled the topic in masterly fashion, first defining salvage and then proceeding to discuss the requisites of a salvage operation, parties who may be salvors, the elements entering into the amount of a salvage award, and similar subheadings, laying particular stress upon the fact that no award can be granted for life salvage unless property is also saved.

The meeting of December 29 was an evening devoted to various aspects of personal injury liability.

Byron O. Pickard, the Safety Engineer in charge of the Accident Prevention Department of the consolidated shipowners associations of the Pacific Coast, explained the work which has been done by his department in educating both the shipowners and stevedores in accident prevention measures. The service includes an inspection of the various vessels, with recommendations for corrective measures where faulty equipment or lack of equipment presents an accident hazard. It also includes actual education of the various stevedore gangs, which has resulted in a noticeable diminution of the ratio of serious accidents on the waterfront.

The second speaker was Albert Michelson, a well known admiralty attorney of San Francisco, who had for his subject "The Shipowner's Liability for Personal Injuries." Mr. Michelson touched upon the distinctions between liabilities under the Jones Act, the Federal Longshoremen's and Harbor Workers Compensation Act, the various State Compensation Acts, and the general maritime law. He pointed out that the extent of jurisdiction under each of these fields depended upon the nature of the employment and the location of the accident, and expressed the opinion that the seaman (which term for certain purposes includes stevedores) is probably better protected than any other class of workman employed in a hazardous occupation.

Freights, Charters, Sales

January 17, 1931

THE British steamer Janeta has been fixed with wheat from Vancouver, B. C., to Hull at 22/6.

The following steamers have been fixed with grain to the Orient: Japanese steamer Ryujin Maru, Vancouver, B. C., to Shanghai, $3, January, (sublet); an American steamer, Vancouver, B. C., to Shanghai, $3, February.

The American steamer Onondaga has been fixed with lumber from Coos Bay to North of Hatteras, January, by Krauss Brothers.

The following time charters have been reported: British motorship Nairnbank, one trip, delivery Vancouver, B. C., redelivery Shanghai, $1.30, January, Canadian American Shipping Company; British motorship Cressington Court, one trip, delivery British Columbia, redelivery China, $1.75, January, Canadian Transport Company.

The American steamer Vanguard has been sold by Richardson Company to Captain Barker, of Oakland.

PAGE BROS., Brokers.

Trade Extension Classes. Smith-Hughes Trade Extension Classes of the Technical Department of the Humboldt Evening High School, San Francisco, were started during the week of January 5. These classes are free and are conducted for the skilled workmen and apprentices engaged in the engineering and building trades and include instruction in mechanical and building trades drafting, plan reading, industrial applied science, industrial applied mathematics, estimating, applied mechanism, applied electricity, diesel engine construction and operation, turbine construction and operation, power house engineering, telephone engineering, practical steel metallurgy, concrete and steel construction, practical advanced surveying, oxy-acetylene welding, and advanced decorative painting, graining, and varnishing.

Buyers' Guide—Fall Issue, 1930— is a directory of manufacturers, fabricators and distributors of Nickel Alloy Steel Products. The bulletin is available for distribution by its publishers, The International Nickel Company, Inc., 67 Wall Street, New York.

Trade Notes

Pacific Coast agency. M. D. Pugh, sales manager of the Illinois Testing Laboratories, Inc., of Chicago, has appointed the James H. Knapp Company of San Francisco and Los Angeles as exclusive Pacific Coast distributor for the "Alnor" and "Price" lines of portable and stationary indicating pyrometers, resistance thermometers, and other electrical and magnetic measuring instruments for industrial use and for power plant operation afloat and ashore.

British Ships Adopting Oertz Rudders. A survey of British shipbuilding and repair districts during late November, 1930, revealed a considerable application of Oertz Rudders, both in conversion and on new vessels.

On the Tyne, the steamers Brixton and Selvistan were being fitted with Oertz rudders by Smiths Dock Co.

On the Clyde, four new vessels, three for British and one for Chilean owners, and each at a different yard, were being equipped with Oertz rudders.

At Southampton the Kenilworth Castle was being docked for the sole purpose of installing this money-saving rudder.

At Birkenhead the steamer Tamarac was in dry-dock for conversion to Oertz and at the Cammell Laird yard every vessel in the outfitting basin, one vessel on the stocks, and one vessel in dry-dock were being so equipped.

Pillsbury & Curtis of San Francisco are Pacific Coast representatives of the Oertz Rudder.

Liner California Welcomed. An elaborate civic program of welcome for the Italian liner California was staged at San Francisco, January 9, inaugurating a new era in the Pacific-European marine passenger and freight trade. The Italian Consul, General Alberto Mellini Ponce de Leon and all the leading municipal and civic organizations took an active part. The General Steamship Corporation is Pacific Coast agents for the Libera Line.

The steamship California is the largest and fastest ever to ply directly between Pacific Coast ports and Europe. She is of 22,700 tons displacement, 14 knots sea speed, carries 182 passengers, and has every facility of the modern ocean liner.

New Sales Manager Appointed. The Tubbs Cordage Company of San Francisco has announced the appointment of Stuart T. Henshaw as sales manager.

Stuart T. Henshaw.

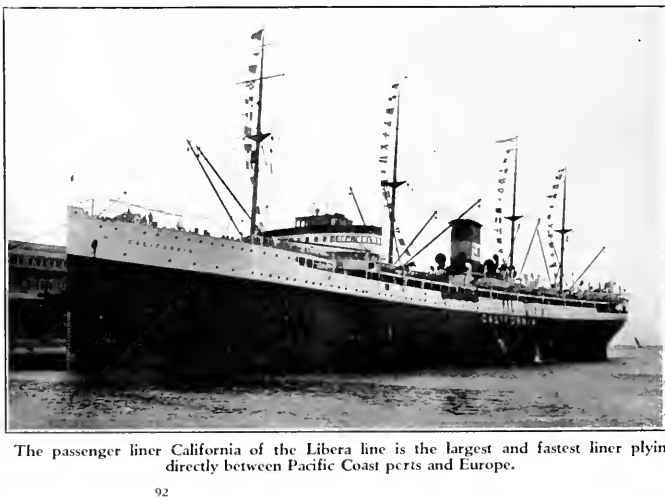
Mr. Henshaw is well known to all branches of the rope buying trade on the Pacific Coast, having served with the Tubbs Cordage Company since 1917. His early apprenticeship was served in the inland valleys. Later he devoted his time to marine sales. Mr. Henshaw plans to renew his many friendships by making a trip through the entire territory served by Tubbs Cordage Company—from the Pacific to the Mississippi—in the near future. The trade will again hear him extol the virtues of Tubbs Rope and Twine.

Watch the Propeller Shaft. Alex McNab well known manufacturer of marine specialties, has perfected a propeller shaft clearance gauge which, with the aid of Arens remote control, indicates the exact amount of wear at the stern bearing. The Lalor Electric & Engineering Co., of San Francisco is distributor for this device on the Pacific Coast.

Pure Oil Assured. The three new fast passenger liners now building for the Matson Navigation Company (Oceanic Steamship Company Line) of San Francisco at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd. are to be propelled by the most modern type geared turbines. Clean lubricating oil for these turbines and their gears will be assured by the installations of two No. 6 Sharples Supercentrifuges especially adapted for the handling of lubricating oil. These centrifuges will be supplied by The Sharples Specialty Company of California.

Large Shipping Merger. The merger of two of the largest American shipping concerns on the Atlantic Coast was accomplished last month with the consolidation of the interests of the International Mercantile Marine Company and the Roosevelt Steamship Company. Four directors of the latter concern were elected to the board of directors of the International Mercantile Marine Company; namely, Kermit Roosevelt, Vincent Astor, Basil Harris, and John M. Franklin.

"The principal object of this consolidation," said P. A. S. Franklin, president of the company, "is the development and upbuilding of the shipping in an important manner under the American flag."



The passenger liner California of the Libera line is the largest and fastest liner plying directly between Pacific Coast ports and Europe.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

MATT J. LINDSAY, retiring freight traffic manager of the Matson Line, was honored last month at a luncheon at the San Francisco Commercial Club, a score of officials and department heads of the Matson Navigation Company, masking a tug at their heart strings with frivolity and banter.

Lindsay, one of the most popular and best known shipping men on the West Coast, retired after more than thirty years service in the Matson organization. He worked shoulder to shoulder with the late CAPTAIN WILLIAM MATSON in the pioneer days when the budding fleet consisted of a few small sailing vessels. His personality and driving energy have played an important part in the development of the present gigantic modern fleet.

Among those who attended the luncheon in tribute to Lindsay were several "old timers" in the Matson organization who had been associated intimately with the retiring official for a quarter of a century or more. They included A. C. DIERICX and F. A. BAILEY, vice-presidents, and W. H. SELLANDER, passenger traffic manager. Other old friends, already retired, were CAPTAIN C. W. SAUNDERS and A. M. McCARTY.

Up the ladder! Goes M. F. Cropley—now freight traffic manager for the great Matson fleet.

M. F. CROPLEY is now freight traffic manager, replacing Matt Lindsay. Cropley has been assistant freight traffic manger for a number of years, and for the time being that position is abolished according to Matson management announcement. Lindsay came to the Matson Line from the old Pacific Coast Steamship Company and prior to that service had been affiliated with the J. D. Spreckels & Brothers' organization. He was a former president of the Transportation Club of San Francisco and is a member of the present directorate.

CAPTAIN BION B. WHITNEY, chief surveyor of the American Bureau of Shipping and resident at Seattle for forty years, was recently retired. In honor of his long service in the northwest he was tendered a banquet by associates. Captain Whitney first arrived in Tacoma in 1888 as second mate of the full-rigged ship State of Maine. He commanded various steam vessels, but in 1901 joined the United States Steamboat Inspection Service as assistant inspector of hulls. In 1903 he was appointed local inspector at Seattle, in which capacity he served until 1917 when he entered the American Bureau of Shipping as chief surveyor of the northwest.

Governor James Rolph, Jr., of the Golden State presents a bronze plaque bearing the seal of California to Captain Angelo Canepa, commander of the steamship California of the Libera Line. Harry S. Scott, president of the General Steamship Corporation, Pacific Coast agent for the Libera Line, and Angelo Rossi, mayor of San Francisco, joined in the ceremony.

Official News *of the* PROPELLER CLUB *of* California

AT the annual meeting of the Propeller Club of California, held January 10 at the club lunch room in San Francisco, the main item on the order of business was the election of officers.

RALPH W. MYERS was unanimously reelected president; VERNON SHOWELL, J. E. BOLGER, BERT ANDERSON, and HARRY HAVISIDE were elected to serve on the Board of Governors for three year terms.

WILLIAM MACDONALD was elected to fill the unexpired term of HUGO PALADINI, who retired from the board on account of business requiring absence from the city on numerous occasions.

—PC—

A number of projects for Propeller Club activity are under way for 1931. Our lunch room committee, namely BERT ANDERSON, E. S. RAMEY, RUSS PRATT, GEORGE SWETT, and JOHN T. GREANY, are working on plans to make the lunch room an attractive place for the members to meet.

—PC—

That the Propeller Club Xmas Show at the San Francisco Marine Hospital had the desired effect of cheering up the boys is shown in this letter:

U. S. MARINE HOSPITAL,
December 24, 1930.

To the Propeller Club,
My Dear Sirs:

Scene—Ward 3 of this hospital. Time—yesterday in the afternoon. Audience—patients this ward surrounded by the vassals of "Gloom," and disgusted with things in general.

And then through the door, followed by his disciples in thought and deed "Fellow Propelliano," came "Good Fellowship."

Then with his tail between his legs, followed by his vassals, slunk "Old Man Gloom," and naturally he was accompanied by "Disgust in General"—and we have not been bothered by that pair of "False Alarms" since!

Sirs—For the bit of sunshine which you brought into our lives we thank you! We wish you the "Best of All That's Good" and may your Xmas Be Merry and the New Year Happy!

(Signed) WM. E. LENEHAN,
on behalf of the boys in Ward 3.

—PC—

Our entertainment committee is outlining the program for the next banquet and the date for this event will be announced as soon as the golf championship date is arranged.

At the wheel again for 1931—Ralph W. Myers, our energetic President, who has shown unceasing interest in Propeller Club activities.

—PC—

Good luck, Fred! Having moved to San Pedro Fred Cordes has resigned from the Board of Governors and Joseph Geary appointed in his place.

—PC—

The Propeller golf committee is developing plans for the Second Annual Spring Propeller Club championship. Our Board of Governors will have an announcement to make in this connection before long.

—PC—

The Board of Governors has in mind the formation of several important committees so that the various members may more actively participate in club affairs. New committees to be formed will assemble data and arrange for interesting programs to be presented to the membership concentrating on vital and timely subjects such as American shipbuilding, port facilities, safety aboard ship, marine hospitals, and maritime legislation affecting American shipping.

—PC—

Our Board of Governors, on behalf of the Propeller Club of California, has unanimously endorsed the $2,500,000 bond issue for relieving distress among San Francisco's unemployed. This measure comes before the votors of San Francisco on February 6. The club feels that this is a most deserving program and sincerely hopes that the citizens will ratify the proposal for such a fund by a one hundred per cent. majority!

—PC—

The Propeller lunch room, 442 Pine street, San Francisco, is functioning on "all-six." Excellent meals at popular prices make this meeting place for our members an enthusiastically accepted innovation. The main thought of the place is that it affords opportunity to "get-together" and talk over maritime matters in congenial company and pleasant surroundings.

—PC—

Out in the Parkside district last Sunday the editor noted quite a commotion in front of a movie. On investigating the jubilating crowd proved to be half the youngsters of the neighborhood congregating around DAN MAHER, who was taking them to see a salt water picture. A good time was had by all!

WILLIAM E. "BILL" CURTIS, veteran of Pacific Coast shipping firms, passed away recently at his home, Alameda, California. Curtis was born in Brooklyn in 1855 and came to California around the Horn in 1874, joined the firm of Goodall & Perkins the same year. He served as chief steward on various ships of the Pacific Coast Steamship Company, and in 1912 he was transferred shoreside as port steward at Seattle, later coming to San Francisco in a similar capacity, where he served the line until the Pacific Coast Steamship Company was taken over by the Admiral Line in 1916. At the time of the merger Curtis was made purchasing agent, and he held that position until retiring on pension in 1923.

HUGH BRITTAN, general passenger agent of the Pacific Steamship Company, operator of the Admiral Line, announces that the liner H. F. Alexander will enter the Seattle-San Francisco-Los Angeles run on May 9, sailing northward for Seattle from San Francisco. The Dorothy Alexander, cruise ship, now in the California-Puget Sound service, will make ten cruises from Seattle to Southeastern Alaska, beginning June 6. Before entering the Alaska run the vessel will make cruises from Los Angeles to Mazatlan, Mexico, sailing May 6 and May 20. The Admiral Rogers enters the Seattle-Alaska service on March 25.

The 1931 annual Steamship Dinner under the auspices of the Maritime Association of Seattle will be held February 21 at the Olympic Hotel. Five hundred was the attendance record last year. C. H. CARLANDER is chairman of the association dinner committee; and his assistants are CAPTAIN LEWIS J. HALL, JOHN CORMODE, W. M. MINOR, JACKSON B. CORBET, JR., and CAPTAIN J. R. JONES.

J. L. CONOVER, Pacific Coast regional manager, announces that the Frigidaire Sales Corporation has established a Pacific Coast regional office at 55 New Montgomery street, San Francisco. This office was formerly in Oakland. The territory for electric refrigerator sales under supervision covers the Pacific Coast, Salt Lake City, and Spokane.

Chief Engineer Alfred Sandreczki of the A-H liner Iowan — thirty years engine room experience— twenty-three of them in the American-Hawaiian fleet.

Captain Charles Nathaniel Bamforth, master of the American-Hawaiian freighter Pennsylvanian, joined the line in 1915 as quartermaster, shipping on the Montanan.

Chief Engineer Herbert F. Bordman of the American-Hawaiian liner Mexican has devoted thirty-five years to marine engineering, twenty-five of them being under the A-H flag.

Captain Louis Laverge, master of the steamship Iowan, went to sea at 11 years and has spent 54 years in the merchant marine. Born in Saint Vaast-la-Hougue, Normandy, France.

CAPTAIN W. O. KOHLMEISTER brought the Dollar round-the-world liner President Fillmore into San Francisco Bay on January 6, and this arrival marked the 168th round-the-world cruise of the Dollar fleet and the completion of seven years globe-circling passenger and freight service.

Back in 1924, Saturday afternoon of January 5 to be exact, at Pier 42 in San Francisco, with whistles from all ships in the harbor blowing salute, the Dollar liner President Harrison sailed out for the Golden Gate, inaugurating what shipping men the world over called an "impossible project." CAPTAIN ROBERT DOLLAR went ahead with this new service, dispatching fast passenger-freight vessels on a fortnightly schedule, and before long they'll turn up the 200th circuit voyage. Dollar round-the-world ships will soon have made five million miles.

Under the recent Matson-Lassco merger, the Matson Navigation Company office at 723 West Seventh street, Los Angeles, has been closed and the staff moved to the Los Angeles Steamship Company passenger offices at 730 South Broadway, where general passenger business of the consolidated lines is handled under the direction of ROBERT F. CULLEN, general passenger agent of Lassco.

J. B. BANNING, JR., who has been in charge of Matson interests in Southern California, is now located in a suite of offices in the Central building, Los Angeles, adjacent to the headquarters of RALPH J. CHANDLER, vice-president and general manager of Lassco. Banning will work in close cooperation with Chandler, particularly concentrating on the development of the freight business of the O & O Line to the Antipodes and of the combined Matson and Lassco fleets to Hawaii.

The appointment of ANSON B. WEEKS and DAVE R. CAMPBELL as assistant managers is announced by A. T. GIBSON, president of the Lawrence Warehouse Company, headquarters at San Francisco. Weeks is a member of the Pacific Traffic Association and the Oakland Traffic Club. Campbell was formerly manager of the warehouse department of the Merchants Express.

Aboard the Heian Maru of the N.Y.K. Line, the twenty-first annual banquet of the Board of Marine Underwriters of Seattle, was held January 17, at Seattle. The annual election of officers of the board, held earlier in the week, brought forth the following officials for 1931: JOHN C. COART, Alexander & Baldwin, president; B. B. PELLY, Balfour-Guthrie, vice-president; and E. H. HUTCHISON, Yangstze Insurance Company, secretary-treasurer.

ROY S. WINTEMUTE is now a director and vice-president in charge of traffic for the General Steamship Corporation. In announcing the promotion of Wintemute, HARRY S. SCOTT, president, also announced the appointment of CAPTAIN HARRY H. BIRKHOLM as vice-president in charge of southern California affairs, with headquarters in Los Angeles. Both of these experienced marine executives have been associated with General Steamship Corporation activities for many years. DREW CHIDESTER is the executive vice-president and general manager. Wintemute joined the firm when it was formed in 1920 and has since supervised the South American and Australian business. Prior to this he was for twelve years with the Canadian Australian Line and three years with the Canadian Pacific at Vancouver.

Captain Birkholm is a ship commander, operating manager, and general steamship executive. He first went to sea in sail and his record shows ten years with the old Pacific Mail Steamship Company as an officer. In 1914 he was surveyor at Seattle for the Board of Marine Underwriters. In 1918 he became operating manager of the Trans-Oceanic Company at Seattle and when this company became part of the General Steamship Corporation in 1920 he was made district manager at Seattle. Captain Birkholm later came to San Francisco, was operating manager for the house, and a few years ago was transferred to Los Angeles as district manager.

JAMES F. HENEGHAN, assistant passenger traffic manager at San Francisco, has been transferred to Chicago with the title of Western passenger agent for the United Fruit Company. HARVEY M. HUFF, general freight agent

He doesn't play golf or drive a car — Bill McStay, publicity director of Dollar Steamship Lines, Inc., Ltd! Twenty-eight years newspaper, publicity and theatrical experience; eighteen years a theatrical, stage, and production manager, advance agent and company manager. Bill's played every place in the U. S. but the Statue of Liberty and Alameda. He's been with the Dollar organization for the past six years.

Harry T. Abbott, chief engineer of the Matson liner Malolo, is now at the Fore River plant of Bethlehem, Quincy, Mass., standing by for installation of machinery for the new Matson Australian-South Seas ships. Claus Knudsen, chief engineer of the Ventura, is with him at Fore River yard. H. T. Keene, formerly chief of the Maui, succeeds Abbott as chief of the Malolo.

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for the line at San Francisco, now becomes general freight and passenger agent.

At the annual meeting for election of officers, January 10, the Portland Steamship Operators Association elected STANLEY E. SEMPLE, general manager in Portland for the Yamashita Shipping Company, president of the organization for 1931. GEORGE EGGERS, operating manager for the States Steamship Co., is retiring president. F. N. MILLS, district manager of the American-Hawaiian Steamship Company, was elected vice-president of the association, and ALFRED R. FREY, general freight agent of the Oregon Pacific Company, as secretary of the association.

ROGER D. PENNEO, manager of the Seattle Marine Exchange since June, 1927, is in charge of the recently established Seattle office of the Quaker Line. The appointment of Pinneo as Northwest manager was made by K. D. DAWSON, president of the Pacific-Atlantic Steamship Company, owners of the Quaker Line, with headquarters in Portland.

FRANK SAMPSON, who has friends in every Pacific Coast port, has returned to sea. Sampson went out recently as second officer of the United Fruit Company steamer Saramacca. He has been engaged in shoreside pursuits for several years. Young in years, but old in experience, Sampson received his training under well-known masters in the Old Pacific Mail fleet.

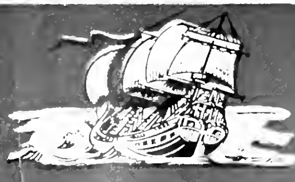
Los Angeles Steamship Association officers have all been re-elected for 1931. The officers entering their second term are: RALPH J. CHANDLER, president; E. A. MILLS, vice-president; and WILLIAM F. MOORE, secretary and treasurer. These officers are also directors. Balance of the board re-elected are: F. A. HOOPER, WILLIAM GROUNDWATER, HAROLD C. SMITH, and R. V. ROSS. All of these men are prominent in West Coast transportation circles and have devoted much time to the association activity and development.

H. J. E. VAN OOSTEN, California passenger manager for the Holland-America Line, announces that advance travel bookings between Pacific Coast Ports and Europe indicate that 1931 will be a strong travel year. Van Oosten made a trip to New York last month, to attend conferences, and proceeded on to the West Indies before returning to the Pacific Coast.

45% OF AMERICA'S MERCHANT MARINE SERVES PACIFIC COAST PORTS

Pacific Marine Review

MARCH 1931



Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

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The National Magazine of Shipping

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Contents

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James S. Hines,
President and Publisher.

Bernard N. De Rochie,
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Member of Pacific Traffic Association

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ACME-P. & A. PHOTO

**"I Christen Thee
President Coolidge"**

Pacific Marine Review

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Editorial Comment » » »

Pacific Coast Shipbuilding

THE Jones-White Merchant Marine Act of 1928 set up a very fine framework on which to build up a merchant marine, and its beneficial effects have already made themselves felt in practically every marine trade. This act was passed almost unanimously and with no bickerings along party political lines. It was backed by a very united public sentiment.

The Jones-White Act predicated improvement in the American merchant marine through assistance from the federal government along two lines: first, reduction in the cost of building new and better ships by government loans at low interest rates and, second, reduction in the cost of operating such ships by favorable long-term postal contracts.

Under the impetus of this bill, a very considerable program of new and better ships is now under way in the shipyards located in a few states on the Atlantic Coast; and the Pacific Coast states are raising very seriously the question "Why do we not get a share in this work?" This question is being raised not primarily by the shipbuilders, but by the people of the Pacific Coast who, in these times of general depression and unemployment, are very properly interested in any possible increase in local pay rolls.

Pacific Coast representatives in Congress have heard this question from the electorate; and as a result a bill is now pending in Congress which, if passed, will grant to American shipowners building ships in Pacific Coast shipyards $\frac{1}{2}$ of 1 per cent. differential in the interest rate on Shipping Board loans. This would mean that in the case of any ship destined for the foreign trade, the Shipping Board would loan 75 per cent. of the cost at 3 per cent. interest if built in a Pacific Coast yard, or at $3\frac{1}{2}$ per cent. interest if built in an Atlantic Coast yard. In the case of any ship intended for coastwise or intercoastal trade the interest rates would be 5 per cent. and $5\frac{1}{2}$ per cent. respectively. The loans in either case to amortize in twenty years.

It is figured that this $\frac{1}{2}$ of 1 per cent. differential will enable ship owners to build on the Pacific Coast at no greater cost than on the Atlantic Coast. For example, in a recent contract for four ships, the work was taken by an eastern yard at $15,920,000, the low Pacific Coast bid being $16,241,000, a difference of $321,000. Allowing 3 per cent. for Shipping Board portion of the financing and 6 per cent. for the owner's portion, these vessels, built at the Pacific Coast figures and considering interest charges alone, would show an advantage sufficient to more than offset the higher cost. Interest, however, is not the only standing charge made against the cost or book value of a ship; and our impression is that the apparent advantage gained from $\frac{1}{2}$ of 1 per cent. differential in the interest rate would not enable the shipowner to consider very much differential in the cost of his vessel. It would therefore be incumbent on the Pacific Coast shipbuilder who desires ship-building contracts to sharpen his pencil just as carefully, or even more carefully, after the passage of this act.

The American shipowner, in the last analysis, is the man to make the final decision as to what shipyard will build his ship or what bid will take the contract. The United States Shipping Board is not making any presents to shipowners. The moneys put up by the Shipping Board are loans that must be repaid; and any American shipowner who is going into world trade at the present time ought to be given the greatest freedom in getting his ships at the lowest possible cost. When an American shipowner gets 75 per cent. of the cost of his vessel at $3\frac{1}{2}$ per cent. he is paying not much, if any, less than the rate at which many of his foreign competitors can borrow funds; and these competitors can get new ships built at from 40 per cent. to 50 per cent. lower costs.

Pacific Marine Review would like to see every shipbuilding way on the Pacific Coast full, and would love to feel the air of our Pacific Coast ports surcharged with the music of riveting hammers. We know that our yards can produce good ships and that the executives and department heads of our shipbuilding plants are second to none. In these respects the fifty-year record of steel shipbuilding on the Pacific Coast has produced results in every type of naval and merchant vessel that will bear comparison with those of any shipbuilding region. The chief handicap at present is that none of the Pacific Coast yards are ready to build large ships. On the contract already referred to, the Pacific Coast yard whose bid was within $321,000 of the low Atlantic Coast bid expected to have to spend $500,000 on plant to properly handle the order. It is obvious that under such conditions, Atlantic Coast yards that are ready and that already have considerable work on hand have a tremendous advantage in the spread of overhead and in smoothly functioning plant and organization.

It has occurred to us in this connection that the civic bodies of the San Francisco Bay region (where are situated the most of the Pacific Coast shipbuilding plants that are even approximately ready to handle ship building) might greatly help the local shipyards and other industries by establishing a revolving fund for the purpose of loaning capital at low rates of interest for necessary plant improvement in any industry where the loan would bring proportional benefits to the community in payrolls and prestige. In other words let the community open to local industries the same beneficial opportunity that was opened to the shipowner by the Merchant Marine Act, 1928.

In the meantime we can all get whole-heartedly behind Mr. Carter's bill for ½ of 1 per cent. differential in interest rate on Shipping Board loans for all ships built in Pacific Coast yards.

It will not put any greater burden on the shipowner.

It will certainly induce every American shipowner who is considering new vessels to get bids from Pacific Coast shipbuilders.

It will undoubtedly result in some Pacific Coast built ships.

The Marine Steam Generator

THE success of the geared turbine in marine propulsion has resulted in great changes in marine fireroom practice and in marine boiler design.

By geared turbine we mean a turbine connected to the propeller shaft by some means of speed reduction which may be either mechanical, electrical, or hydraulic. The success of these gear systems in transmitting large powers effectively and efficiently has enabled the turbine designer to compress very large powers into very small space and comparatively low weight, both prime economical considerations on shipboard. This saving of space and weight in engine rooms has focused the attention of marine engineers on boiler and fireroom design for new vessels as a field for further savings of weight and space.

Modern metallurgy has met the demand for commercial materials capable of safely withstanding the stresses due to high pressures and temperatures; and considerable success has already attended the efforts of marine boiler designers and manufacturers to dispose these materials to the best advantage for the commercial success of the marine power plant. The progress in this direction is well exemplified in a comparison between the boiler installation on the Leviathan and that on the Bremen. The Leviathan has 43 water-tube boilers to generate steam for 65,000 horsepower. On the Bremen there are only 20 water-tube boilers to generate steam for 100,000 normal horsepower and these boilers on sea runs have already generated up to 120,000 horsepower.

Nine of the Bremen's boilers are designed for 3300 horsepower each, and 11 of these boilers each take a normal load of 6600 horsepower.

The ordinary Scotch double-end marine boiler, with 250 pounds pressure and with 2000 horsepower output, has a weight (boiler and water) of about 390 pounds per horsepower. The double-end water-tube boilers of the Bremen work on 370 pounds pressure, develop 6600 horsepower, and have a weight (boiler and water) of about 61½ pounds per horsepower.

As a result of this saving and that effected through the use of geared turbines instead of direct connected turbines, the Bremen uses slightly less space and weight to generate and apply 100,000 horsepower than the Leviathan requires to generate 70,000 horsepower.

Within the weight and space limitations imposed on the marine engineers by the naval architect, it is possible to get excellent over-all efficiencies for marine boilers; and these efficiencies are available in commercial design. The steamship Statendam, for example, is getting 84 per cent. efficiency out of her boilers in regular service. On shore, efficiencies as high as 93 per cent. are being obtained, but these involve use of types of air heaters, economizers, and other equipment that require weight and space impractical in marine power plants.

In present practice, large boiler plants ashore are going to pressures above 1000 pounds per square inch, with occasional plants in the United States and Europe operating at 1500 pounds and over. There are now several plants at sea operating on 400 pounds boiler pressure, and undoubtedly marine plants will, before long, be operating at 500-600 pounds, with superheats up to 800 degrees Fahrenheit total temperature.

American marine engineers and marine boiler designers are taking advantage of these modern improvements on many of the vessels built in recent years. The following comparison between two well known sister ships is taken from a paper on "Increased Economy in Marine Steam Machinery," by J. H. King, read before the 1929 meeting of the Society of Naval Architects and Marine Engineers, and shows markedly improved operating conditions due to better boiler plant.

The Panama Pacific Line turbo-electric liner California is slightly less in displacement than her later sister, the Virginia. Both ships are fitted with General-Electric propulsion machinery developing 17,000 shaft horsepower at 120 revolutions a minute and 18 knots speed. The California has 12 Babcock & Wilcox boilers, with a total of 55,176 square feet heating surface, working pressure 275 pounds, and 100 degrees Fahrenheit superheat. The Virginia has eight Babcock & Wilcox boilers, with a total of 43,688 square feet heating surface, 300 pounds working pressure, and 200 degrees Fahrenheit superheat. The Virginia's turbines have a lower water rate because of higher pressure and temperature; hence less heating surface is needed. The Virginia's boiler installation cost 15 per cent. less than that of the California and she has a better fireroom layout and saves considerable weight.

During her first year of operation, the Virginia averaged 16,012 shaft horsepower and 0.738 pound of fuel per shaft horsepower for all purposes. During the same time on the same run, the California averaged 15,320 shaft horsepower and 0.793 pound per shaft horsepower for all purposes. Under full power conditions, the fuel consumption per shaft horsepower for all purposes is, for the Virginia, 0.70 pound; for the California, 0.76 pound.

The Virginia, on exactly the same route, with slightly larger displacement and developing more horsepower, uses 110 tons less fuel per round voyage. On a substantially lower initial machinery investment, the Virginia shows a saving in fuel costs of approximately $650 per round voyage. It would, of course, be possible to greatly improve this comparative showing by adopting higher pressures and superheats.

While the designing marine engineer is developing new and improved steam generators and steam engines, the bulk of the merchant marine fleets of this old world are still operating on the old reliable Scotch boiler, triple expansion engine combination, and it is probably possible by the exercise of intelligent cooperation between the shore and the ship, the deck and the engine room, and the engineer and his plant to effect tremendous savings in fuel and other operating expense.

Operators' carelessness and lack of attention to apparently trivial details will spoil the economy record of the most modern and efficient power plant, while intelligent nursing of an obsolete plant will often bring surprising results. A little investment by the management in testing or measuring equipment often encourages the operator to take more interest in checking up the plant and eliminating losses. In these days of oil burning, the fireroom should be kept as clean as any part of the vessel, and an excellent method of encouraging the fireroom crew toward clean, safe working quarters is to paint the interior of the space a light, serviceable color and to provide ample lighting. Dark corners are generally dirty corners, and dirty corners breed careless operation.

Permanent Public Committee on Marine Shipping Problems

DURING the Third National Conference on the Merchant Marine, held in Washington in 1930, there was advanced the necessity for providing means whereby a common meeting ground could be provided for shippers, shipowners, and underwriters for the better understanding of marine insurance questions, as a medium for the use of shippers, shipowners, and underwriters who might have misunderstandings difficult of solution between themselves, and to provide an opportunity for shippers to be heard in all matters of mutual interest. A committee to be known as a Permanent Public Committee for the Consideration of Marine Insurance and Shipping Problems has been appointed and has been organized as follows:

Representing the Public: The Honorable E. C. Plummer, Commissioner U. S. Shipping Board, Washington, D. C., chairman; Laurens N. Prior, Bureau of Navigation, Department of Commerce, secretary; A. Lane Critcher, Bureau of Foreign and Domestic Commerce, Department of Commerce.

Representing the Vessel Owners: H. B. Walker, president of the American Steamship Owners' Association; J. D. Tomlinson, vice-president of the American-Hawaiian Steamship Company.

Representing the Underwriters: W. R. Hedge, president of the Boston Insurance Company of Boston; Wm. D. Winter, vice-president of the Atlantic Mutual Insurance Company of New York.

Some Windjamming Skippers

IV. *Captain David Gilmore*

By F. C. Matthews.

CAPTAIN DAVID GILMORE was one of the most prominent American merchant sailing-ship masters, and ranked very high in his profession. Although of a quiet and unassuming disposition, he was smart and active, and successful in the management of the property confided to his trust. A thorough seaman and strict disciplinarian, he was yet just to subordinates and never in trouble with his crews.

Captain Gilmore was born in Woolwich, Maine, in 1840, the eldest son of a family of ten children. His first venture at sea was made when he was 19 years of age, in the ship Assyria, of which his uncle, Captain John P. Delano, was commander.

In 1874 he became master of the ship Austria, leaving her eight years later to take the Samaria. In 1884 his employers, Houghton Brothers, of Bath, had the ship Servia built for him to command. It was the custom for a ship owner to look around for a first-class commander before starting construction of a new ship, and it was an honor to a captain to be appointed master of a vessel before her keel was laid.

Captain Gilmore was in command of the Servia on three occasions, and was subsequently in the bark Guy C. Goss and ships Parthia and St. Paul, the latter in 1905, about which time he retired from sea life to make his home with his brother, Irving Gilmore, at Auburn, Washington. He died in August 1916 from a heart shock superinduced by an automobile accident, and his remains were sent East for interment, accompanied by a nephew, George F. Trott, of Auburn.

Captain Gilmore had rounded Cape Horn thirty-nine times; the Cape of Good Hope four times; passed through the Straits of Gibraltar eight times; and made four voyages completely around the world. After his death all his maps, charts, and records were burned. The great-grandfather of Captain Gilmore had come to this country from England in 1699.

A Well Lighted Ship

By A. L. Powell,
Manager, Eastern Office, Nela Park Engineering Department, General Electric Company

A FEW weeks ago the very well known and most progressive architect, Raymond Hood, in discussing the question of lighting and interior decoration of ships, made a statement somewhat as follows, "when the average American goes abroad it is a great event in his life. He has saved for this for a long while and has made very careful plans. He is likely to be somewhat more extravagant than in his normal affairs and wants to be sure that he is making his trip under conditions representative of the best that can be had. He likes to feel that the boat he travels on is the last word in design, decoration, and comfort."

This is, indeed, quiet true, and some of the European lines have been quick to sense this state of mind. They have incorporated in their recent liners very advanced and even radical ideas on decoration and lighting. This policy has proved sound, for there is no doubt that some of these boats which are the most elaborately equipped have yielded returns even in a time of depression. There is no doubt that on a competitive basis the American lines must "spruce up," otherwise the great travelling public will desert them. The element of patriotism is not so strong as to cause one to favor a ship which is obviously much less up to date than some other.

In general, the decoration of American boats has been planned along quite conservative lines. The lighting is reasonably adequate, though quite prosaic and by no means up to modern standards. Tradition seems to have governed the selection of lighting equipment. If a fixture was good enough twenty five years ago in the days of the carbon lamp, those responsible apparently feel that it is still just as good today. In other words, there has been a tendency to stick in a rut and continue to specify the same sort of fixture year after year. There has been a great advance in the art of lighting during the last decade. Efficient Mazda lamps are universally used and new methods of applying these have been developed. In American commercial buildings there has been a whole-hearted adoption of modern lighting and on shore we are, generally speaking, ahead of Europe in illumination. On shipboard, however, as mentioned above, the conditions are reversed. The latest European boats are especially noteworthy in their lighting. Some of this is radical and scarcely appeals to our taste. In other instances extremely delicate decorative effects have been secured.

The steamship Excalibur is a combination freight and passenger vessel and has accommodations for approximately 150 passengers. Every effort has been made to install the finest appointments for a given service that could be obtained and a series of most pleasing public spaces and staterooms has been produced. In the early stages of the design, George G. Sharp of New York, the naval architect, gave consideration to the question of lighting. He desired as far as practical to eliminate direct overhead lighting without adopting indirect lighting, and therefore specified for dining room, foyer, corridors, and the larger staterooms a semi-indirect type of wall bowl or urn, eliminating exposed metal work.

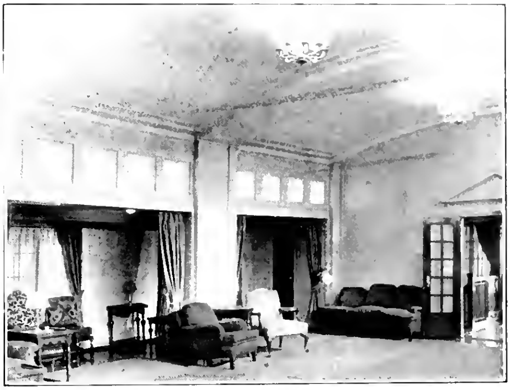
Special Wall Luminaire

On shipboard there is comparatively little head room in many areas and certain types of fixtures are therefore out of the question. Much of the lighting must be accomplished from side wall rather than ceiling outlets. The ordinary type of side wall bracket is not a very satisfactory lighting fixture. It is placed relatively low, directly in the line of vision and, if the socket is equipped with a lamp large enough to give adequate illumination, considerable glare is created. If, however, we equip a side wall outlet with a sort of device which directs the light up and out toward the ceiling, producing indirect or semi-indirect illumina-

Three views featuring the illumination of the dining saloon of the combination passenger and cargo vessel Excalibur of the Export Line.

Beauty, Variety, and Illuminating Efficiency in Marine Lighting Fixtures

The enclosed forward end of the promenade deck is used as a veranda cafe and is lighted by water-tight, holophane, prismatic globe fittings.



Upper left shows private veranda for group of staterooms with decorative bronze side-wall lanterns and drum-shaped ceiling fixtures. Upper right shows the library with ceiling candelabra, table lamps, and concealed lamps back of the clerestory windows. At left is shown the main foyer with large central luminaire housing four 100-watt Mazda lamps. The molding around this fixture houses also four loud-speakers for broadcasting radio programs.

tion, much better results can be obtained.

Working on this principle, the interior architects, Maust & Hoffmann, in cooperation with Lenox, Incorporated, of Trenton, New Jersey, and the writer, developed a luminaire which has many points in its favor. For these side wall semi-indirect units the famous Lenox china is used instead of the customary glass. This material has the property of reflecting the light very well and transmitting but a small amount. The whole unit becomes softly luminous in a most pleasing dark cream tone and is of low brightness. For general illumination in the lower portions of the foyer, dining room, and certain staterooms, two types of side wall urns are used on the Excalibur. These are approximately 9 inches wide, 9 inches deep, and extend from the wall 6 inches. The socket is in a flush bronze fitting and the chinaware mechanically supported.

In addition to this novel type of fixture, many more conventional forms are, of course, used, so a brief description of the lighting of the various parts of the ship is of interest in indicating how new and old designs may be coordinated to produce a very pleasing ensemble effect. Suppose we take a trip through the ship, entering the library on the promenade deck.

Promenade Deck

The library is approximately 40 feet square, with a vaulted ceiling rising to a height of 12 feet. It is treated in the Georgian style and finished in tones of very light green with a carpet of gray-brown, drapes of blue-green, and furniture in various colors. For general illumination there are three 8-light candlestick fixtures with 25-watt Mazda lamps and light buff silk shades lined with white. This equipment was supplied by the Sterling Bronze Company. A number of small single-light silk shaded table lamps are scattered about the room at strategic points. In the low ceiling side areas there is a total of 8 shallow glass ceiling hemispheres with 40-watt Mazda lamps. Behind each window of the clerestory is placed a weather-proof outlet with 25-watt Mazda lamp, the light from which renders the stippled glass luminous and gives an additional touch of decoration. A unique touch is provided by the reading lamp in the shape of a globe, which is shown in the close-up view. This is mounted on a base which has cast in it the signs of the Zodiac. The spherical portion is about one foot in diameter. In this is mounted a lamp, the light from which escapes through a circular opening. This is a product of the Crest Lamp Company of Chicago.

On our way aft we glance into one of the typical double staterooms. The provision for lighting staterooms on board ship means much to the comfort of the passengers and the success of the voyage. This question has been given careful attention in the case of the Excalibur. In this type stateroom general illumination is furnished from a close ceiling hemisphere with 40-watt Mazda lamp controlled by wall switch near the entrance doorway. At each mirror are two delicate silk-shaded wall brackets which provide illumination for one's toilet as well as for reading in bed.

The smoking room is similar in construction to the library, although somewhat smaller. The ceiling is treated in light buff, the walls and moldings are in antique chestnut, with leather covered furniture harmonizing. General illumination is provided by a central ceiling luminaire in the form of an octagonal box of metal and glass containing four 50-watt Mazda lamps. In the lower side sections there are six similar luminaires, though smaller fittings, with three 25-watt lamps each. Scattered around the side walls are a total of 28 2-light candlestick brackets with 25-watt Mazda lamps and mica shades. These fixtures were made by the Sterling Bronze Company. The small side windows are lighted as described in connection with those in the library.

The glass enclosed deck space forward is furnished as a verandah cafe and is pleasingly finished in light cream with panels outlined in stripes of dark tone. The furnishings are of wicker. For artificial illumination outlets are regularly spaced on 10-foot centers. Watertight holophane prismatic globe fittings with 60-watt Mazda lamps are placed seven feet above the deck.

A Deck

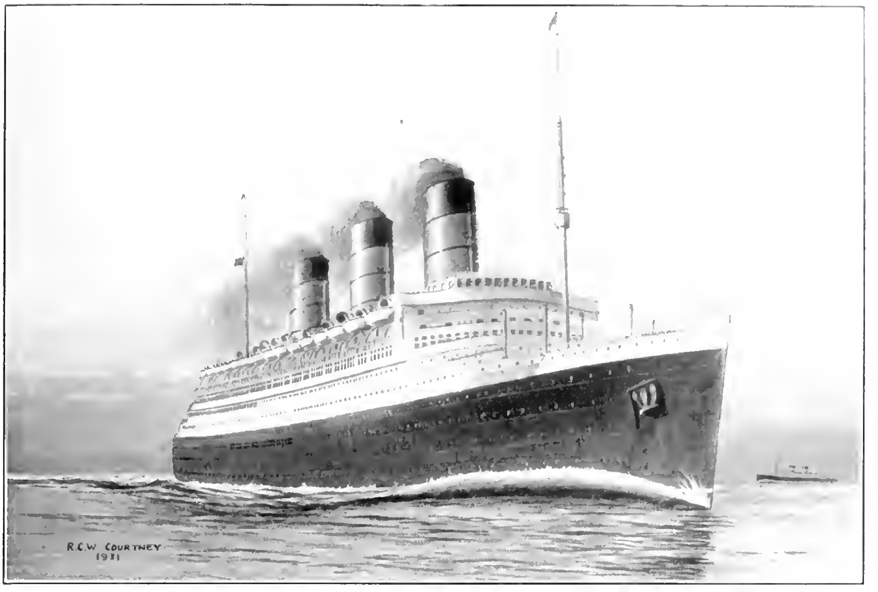
The main foyer is located amidships on A Deck above the dining room. It is 40 feet long and extends the width of the ship. It has a central well, surrounded by a wrought metal balustrade. Above the center of the well on the underside of the promenade deck is a luminaire by Sterling Bronze Company. This gives some general illumination as well as provides light for the center of the dining room. It consists of a mitered, rectangular, closed ceiling box of metal and glass and contains four 100-watt Mazda lamps. An interesting feature is the placement in the molding which surrounds the luminous portion of four loud speakers for broadcasting radio and phonograph music to the foyer and dining room. On the ceiling above the floor space are eight shallow glass hemispheres, with 60-watt lamps. At 9-foot centers along the side wall, 5 feet 9 inches above the floor, Lenox semi-indirect wall urns, Type A, are placed with 100-watt Mazda lamps. There are numerous silk-shaded wall units at the writing desks.

A novel feature of the lay-out on this ship is the grouping of six staterooms around a private veranda. Four such suites are provided on A Deck. The veranda itself is most artistically arranged. Rather modern metal work is used on the adjoining windows. A drum-shaped ceiling fitting and two side-wall lanterns furnish the illumination. These are of bronze finished in verde with inset glass panels. The staterooms in these suites are beautifully furnished with metal furniture finished in grained mahogany. General lighting of each is provided by three semi-indirect side-wall fittings by Lenox, Incorporated, with 60-watt Mazda lamps. These are similar in shape to those used in the foyer but are of Type B design. On the dresser are placed two silk-shaded stand lamps, and a third unit is placed by the sofa. By each bed is a reading lamp of a new type. This consists of a cubical box of stamped metal in the sides of which are cut rectangular openings. The light from a 25-watt Mazda lamp within shines through the opening and serves as a bedside night lamp. In each are two lamps separately controlled so that this unit may be used for single or twin beds without annoying other passengers. These fittings were produced by Walter Johnson, Inc.

B Deck

The dining room is on B Deck immediately beneath the foyer and is approximately 40 x 75 feet. As mentioned above, the ceiling is broken by a well 15 x 25 feet. The height at the sides of the room is 9 feet. The ceiling, walls, and columns are light green in finish, the floor is covered with brown and tan Selbolith, the furniture is brown mahogany, upholstered in blue. In the side bays the same type of wall urn as used in the

(Please turn to Page 130)



A naval architect's conception of a quartering view of the new Cunarder as she will appear at full speed. Drawn especially for Pacific Marine Review.

Cunard Super-Liner

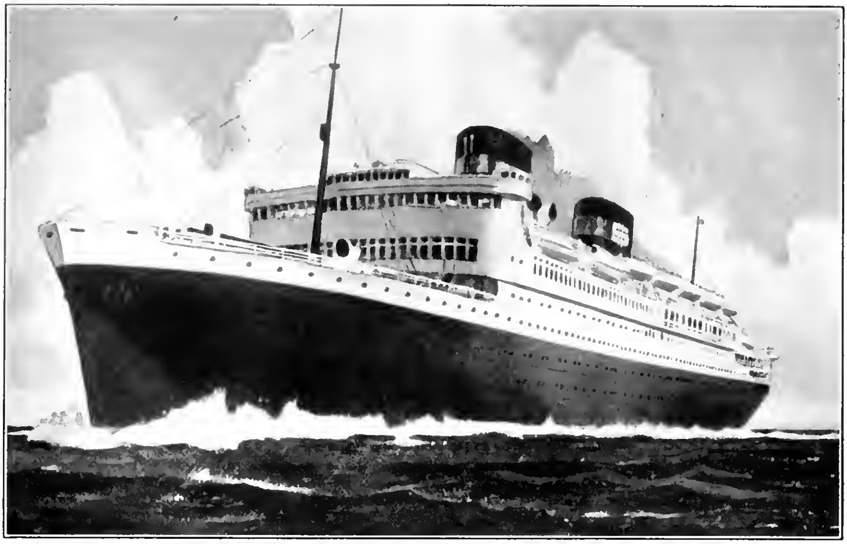
A Few Details of the Design which Great Britain Hopes will Bring Back the Blue Ribbon of the Atlantic

By R. C. W. Courtney

DEFINITE information is now available concerning the new North Atlantic express liners for both the Cunard Steam Ship Company and the Compagnie General Transatlantique. Construction of the first ship is now actively proceeding at the Clydebank shipyard of John Brown & Company, and it is stated that completion will be effected during the early fall of 1933. From the information which the owners have released for publication it is possible to obtain a fairly good idea as to the vessel's ultimate appearance, and there is little doubt but that the reputation of the Clydeside shipbuilders for producing many of the world's finest ships, both as regards looks and efficiency, will be fully maintained. A very sharp contrast is at once apparent between the general design and that of the Bremen and Europa, as, whilst the German liners embody many departures from the orthodox, the Cunarder will preserve the symmetry of her famous predecessors. The length has already been given as 1018 feet, with a beam of about 118 feet, and a gross tonnage of 73,000. As the ship will have to accomplish a round voyage from Southampton to New York and be ready to sail again within the space of 14 days, a sea speed in excess of 30 knots will have to be maintained.

Within the hull proper there will be four decks above the water line running practically over the entire length, the location of the main saloon, which will be about 130 feet in length, being on the second deck down. A raised forecastle 110 feet long is arranged forward, the distance at the stem head to the waterline scaling 60 feet or 16 feet more than the corresponding dimension for the Bremen. The three superstructure decks are continuous, the uppermost or boat deck being 610 feet in length and the others slightly longer in proportion. The promenade deck space is entirely glazed in. The fore end of the superstructure and navigating bridges is rounded on similar lines to that of the Mauretania; and the distance from the top of the chart house to the water line is 100 feet. The boat equipment includes 28 large and two smaller lifeboats arranged 15 a side in conjunction with the latest pattern gravity davits. The three stacks are about 36 feet across the widest part, and the space between each is 110 feet. The caps of the two masts are about 200 feet above the water, this figure being somewhat below that of several of the other large Atlantic liners.

An interesting feature of the design is the retention of the old pattern cowl ventilators on similar lines to the new C. P. R. Empresses and other recent British-built ships, this method of conveying air to the boiler rooms having apparently been able to hold its own against the various systems of trunks and intake ducts.



An artist's conception of the President Coolidge as she will appear when finished.

Launching of the President Coolidge

A New Queen of the Pacific Ocean Passenger Liners Slides into the Historic James River at Newport News, Virginia

ON February 21 promptly at 11:30 a.m., Mrs. Calvin C. Coolidge expertly broke a bottle of water over the prow of the largest turbo-electric passenger vessel ever built in an American shipyard, christening that vessel President Coolidge. Since only last December we published almost the same words concerning the S. S. President Hoover, we must explain that no two sister ships are identical in all their measurements; and we are credibly informed that the President Coolidge is at least an inch or two longer than the President Hoover, hence she is the largest. Whereas the bottle smashed by Mrs. Hoover on the nose of the steamship President Hoover contained mixed sea water drawn from various parts of the oceans to be traversed by that vessel, Mrs. Coolidge wielded a bottle filled with water from the brook that flows through the Coolidge farm in Vermont. Typical this of the two men — Hoover the international engineer—Coolidge the silent statesman of New England. We do not know whether New England brook water was ever before used to christen a deepsea vessel, but lest any old shell back sneer at the use of fresh water for this purpose, we must add the incontestable statement that this brook water has been used to christen thousands of the best deepsea sailormen the world has ever known.

President R. Stanley Dollar of the Dollar Lines, together with Mrs. Dollar and Miss Diana Dollar, journeyed from San Francisco to attend the launching. Mrs. Coolidge was accompanied by her daughter-in-

OWNER AND SPONSOR
Mrs. Calvin Coolidge and a party just before the christening. Left to right: R. Stanley Dollar, Mrs. R. Stanley Dollar, Mrs. Coolidge, Mrs. John Coolidge, and Miss Diana Dollar. Homer L. Ferguson, president, Newport News Shipbuilding & Drydock Company, can be seen standing directly in back of Mrs. Coolidge.

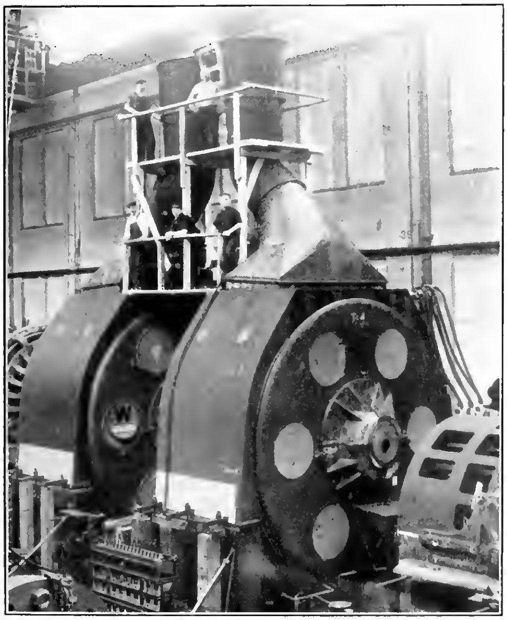
law, Mrs. John Coolidge. Homer L. Ferguson, president of the Newport News Shipbuilding & Drydock Company, presided on the launching platform with his usual genial dignity.

Immediately after launching, the President Coolidge was towed to the outfitting dock alongside her twin sister, President Hoover. The two vessels made an imposing picture and an eloquent testimony to the growth of American trade on the Pacific and the importance of San Francisco as a world shipping port. Sixty-three thousand tons displacement, fifty-three thousand shaft horsepower in two ships costing sixteen million plus, as the beginning of expansion for a world round service that only seven years ago was merely a dream in the mind of one rather elderly gentleman.

The new Dollar liner President Coolidge is a steel, twin-screw vessel with nine decks, a slight raked stem, and semicruiser stern and with two stacks and masts. Her length is 653 feet, depth 52 feet, beam 81 feet, gross tonnage 23,000, and deadweight 15,800, with 67,000 cubic feet of refrigerated cargo space.

This palatial and latest addition to the fleet of President liners will accommodate 350 first class guests, 150 special class or intermediate passengers, and has a total passenger capacity of 1260, with accommodations for a crew of 300. Her sea speed will be 21 knots.

The President Coolidge is driven by twin screws each direct-connected to a Westinghouse 13,250-horsepower, 400-volt, 3-phase, 44.3-cycle, 133-revolutions per minute synchronous motor. The motors are supplied with power from two Westinghouse 10,200-kilowatt, 2660 revolutions per minute turbine generator sets, the turbines being designed for 275 pounds throttle pressure, 200 degrees Fahrenheit superheat, and 28 inches vacuum. The main control utilizes mechanically operated air-break contactors and is arranged so that all operations, including turbine speed control and set-up connections for operating both motors from either generator alone, are controlled from the station in front of the instrument panel.



The two main propulsion motors for the President Coolidge on the test floor of the Westinghouse shops at East Pittsburgh; 26,500 horsepower total at 133 revolutions per minute.

The main turbines are provided with the oil impeller governor which is supplied with oil by a centrifugal oil pump which also supplies the lubricating system. These turbines also are fitted with solid forged rotors, a construction which has been applied on several hundred turbines in service ashore and which because of its inherent sturdiness and stability of balance deserves to be universally adopted for marine service.

This ship is equipped with Westinghouse propeller type blowers for main motor ventilation.

Power for excitation and auxiliaries is furnished by four Westinghouse 500-kilowatt, 240/120 volt, direct-current turbine generator sets of new high efficiency light-weight design.

Except the turbine driven boiler feed pumps and main lubricating oil pumps, all auxiliaries are Westinghouse electrically driven. These include carbon dioxide brine, main condensate, fuel oil service, fire and sanitary pumps, compressors, forced draft fans, cargo and boat winches, warping and automobile capstans and steering gear. In addition to the 365 Westinghouse stateroom fans, there are 180 Westinghouse motors used in the operation of this ship, ranging from 1/10 to 13,250 horsepower.

This ship is also equipped with electric heaters for staterooms and bathrooms, especially constructed by Westinghouse for marine service. These involve some radical changes from similar heaters used in the home.

Steam for the main and auxiliary turbines is supplied by twelve Babcock & Wilcox interdeck, superheater type, oil-burning, water-tube, marine boilers arranged in two boiler rooms and equipped with Babcock & Wilcox oil burners and with Babcock & Wilcox soot blowers. Lubricating oil coolers, fuel oil heaters, evaporators, distillers, and filters are of Griscom-Russell manufacture. Emergency generator sets are Buda. The Warren Steam Pump Co. supplied the majority of the pumps. Brunswick-Kroeschell Co. is supplying the complete refrigerating plant.

The American Engineering Company is supplying its latest type electro-hydraulic steering gear and the steam windlass. The warping capstans and gypsy were made by the Hyde Windlass Company. Fire alarm system, fire detecting system, and fire extinguishing system are by Walter Kidde & Co. The cargo winches are by Lidgerwood. Henschel supplied the interior communication telegraphs. Much of the navigation equipment is supplied by the Sperry Gyroscope Company.

The interior decoration and the furnishings of the public rooms and special suites are being designed and constructed by the A. F. Marten Company of San Francisco. Kearfott Engineering Company supplied special windows and transoms and operating gear for same. Vehisote is used extensively for ceilings and partitions.

A clean hull is most essential in order that the vessel maintain her express schedule of 21 knots. To insure this requirement the vessel's underwater surface has been coated with Germicide Composition manufactured by the American Marine Paint Company.

Some Load Line Foresight

A Plea for the Use of Common Sense Based on American Experience in Establishing Load Lines for American Coastwise and Intercoastal Shipping

By David W. Dickie

IN the preparation of this article I wish to acknowledge the assistance rendered by the San Francisco offices of the American Bureau of Shipping and Lloyd's Register of Shipping, C. H. Woodward, marine superintendent of the Panama Canal, and William C. Empey, president and manager of the Guide Publishing Company.

Should a load line become applicable by law to coastwise and intercoastal shipping at some date in the future, that load line should be based on definite experience of safety in these trades. Such experience is on record in great quantity; and, based on a careful study of the record, it is our intention herein to prove:

First—That not less than the so-called Tropical Timber Load Line should apply all the year round to the vessels with a lumber deck load departing from the Pacific Coast.

Second—That it should apply to the entire Pacific Coast and not to San Pedro alone.

Third—That there is ample margin of safety over and above the line to which experience has shown vessels can be safely loaded.

Fourth—That by the time the vessels reach the Panama Canal they have decreased in draft sufficiently to assure ample safety in hurricane weather.

It is probable that load line legislation will be enacted by the United States regulating the loading of cargo ships in the coastwise and intercoastal trades, as this is practically the only maritime nation that is without such law. If shipping is to grow in keeping with the intent of the Congress it can hardly be expected that large sums of public money will be lent for the purpose of building up a merchant marine without some safeguard being placed on the depth to which such ships shall be loaded. In this country legislation must apply to all ships; and a ship enjoying government aid cannot be required to have a load line while another running in competition therewith is permitted to load without restraint.

U. S. Experience Unique

There is no reason why the United States ships in the intercoastal trade should be assigned a load line that meets with the approval of, or is governed by, the experience of other nations which are prohibited by law from engaging in the trade, especially since the United States is the only nation that has had any experience in carrying lumber as a deck load in large vessels. The load line of such vessels should be determined from the experience gained in the home trade and it would be very unwise to become tied to the apron strings of obsolescence in coastwise and intercoastal shipping.

Panama Canal Records

The studies in connection with the accompanying table have been in progress since the early part of 1928 by observers seeking in some cases to prove the present practice in error and by others to find a suitable formula for determining the load line of vessels having a lumber deck load. The table gives the dimensions of a number of representative vessels eastbound with lumber on deck with the drafts at the Panama Canal as given by C. H. Woodward, the times taken from The Guide and the Panama Canal Record, and the calculated drafts at the place of departure such as San Pedro, San Francisco, or Puget Sound. The drafts at the Panama Canal are used for the reason that the canal authorities can by no stretch of the imagination be accused of being interested parties one way or the other. The vessels average approximately 7/8 inch per day decrease in draft from the use of fuel, water, and stores from the time they leave the port of departure until they reach the canal. As the Panama Canal drafts are taken in the smooth water of the locks they should be accurate. A possible mistake of an even foot would be noticeable.

The deep loading with lumber deck loads, as shown in the table, is not a recent development but represents years of experience. It started with the wood sailing vessels and progressed by degrees on the wood steam schooners until at one period the vessels loaded with the main deck as much as 16 inches under water. It was the loading of the steam schooners that prompted the loading of the larger vessels in accordance with the present practice.

The steel steam schooners load approximately two feet deeper than the ordinary cargo vessels, as will be seen by vessel No. 4 in the table. Only one or two of the steel steam schooners load with the deck under water when loaded with lumber and as the negative freeboard is only 3 inches it is not startling.

Pacific Coast Loading Safe.

The important thing that was demonstrated by the Pacific Coast method of loading the lumber vessels having a deck load was that the old freeboard tables were wrong. The number of accidents has been so small as to be negligible. The records show that in about 25,000 voyages of ships going foreign and intercoastal there were only twenty-three accidents to the deck load as follows:

Jettisoned or discharged deck load due to stranding	5
Lost deck load due to collision	1
Heavy weather deck load shifted at sea but not lost	5
Heavy weather lost or jettisoned part of deck load at sea	10
Discharged deck load in port due to list, broken pipes to double bottom, etc.	2
Total	23

The above record speaks for itself and certainly is no cause for alarm insofar as insurance rates are concerned. In only ten instances or 4 100 of 1 per cent. was any part of the deck load lost or jettisoned due to the weather, and, so far as can be learned, there has been no loss of life that could be remotely attributed to the deeper loading with lumber deck loads.

Not all vessels can be loaded to the drafts given in the table, as they do not have sufficient stability to remain upright with the high deck load, and some are of web frame construction that makes proper stowage below decks impossible.

Experience gained with the present vessels proves quite clearly that with a properly designed vessel having beam enough to carry the deck load and quarter subdivision of the double bottom the timber deck load difference for vessels leaving the Pacific Coast can be taken with perfect safety at 50 per cent. of the full superstructure allowance of the present United States Regulations instead of 33.25 per cent. as these and the International Rules provide where the superstructures cover 50 per cent. of the length of the ship. This would make the Summer Timber Allowance 21 inches instead of 14 inches, as allowed by the International Load Line Conference on the 400-foot ship. In other words, for a vessel having a poop, bridge, and forecastle equal to .50 of the length of the ship the superstructure allowance with a timber deck load would be 86 per cent. instead of 69.25 per cent., as given in the United States Regulations, and the difference in the percentage of wells would be 100 instead of 66.5, as given in the table accompanying the article in the November issue of the Pacific Marine Review. The above freeboard allowance is practically the same as the present Tropical Timber Allowance.

The Tropical Timber Allowance should apply to the whole Pacific Coast as far north as Puget Sound, as no distinction has been made in the accompanying table between vessels sailing from Puget Sound, Gray's Harbor, San Francisco, or San Pedro. They have been taken as they came in regular order throughout the three years without regard to summer or tropical season.

At this point I wish to make clear that at the present time the name "Tropical Timber Load Line" has been given to a mark that Pacific Coast experience has shown has nothing to do with "tropical" as applied to seasons. There is one external condition that affects a ship loaded with a lumber deck load from a practical point of view and that is the formation of ice from freezing weather. Ice affects the problem because it alters the position of the vital centers of the ship. It is only necessary to provide stability for the formation of ice on the Atlantic Coast in the months that freezing weather occurs.

Stability versus Seasonal

No distinction has been made in the loading of ships on account of seasons on the Pacific Coast because stability is the governing factor. If the ship is too stiff, that is too stable, the deck load cannot be held in place. The ship must ride easy whether there is a storm or not; and if she rides easy a storm will not affect her provided it is not accompanied by freezing weather. Hence there should be a Timber Load Line and an Ice Timber Load Line.

The table shows:

First—That 74 per cent. of the vessels loaded deeper than the Tropical Timber Load Line and that this deeper loading averaged 3.932 inches.

Second—That 21 per cent. of the vessels loaded lighter than the Tropical Timber Load Line and that the lighter loading averaged 0.619 inch.

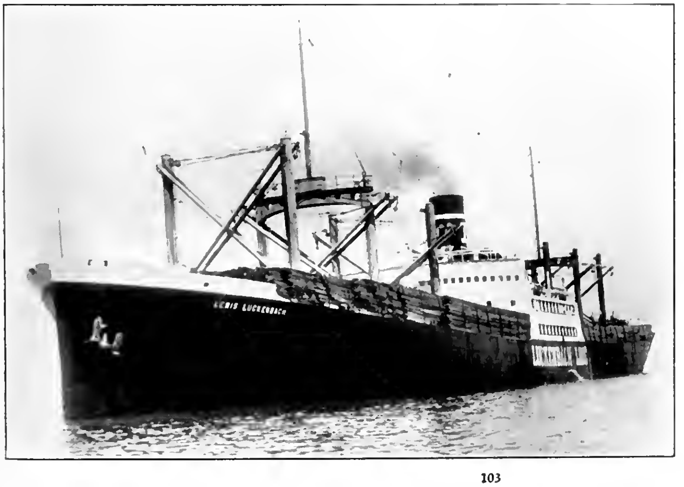
Third—That 4 per cent. loaded even with the Tropical Timber Load Line.

Fourth—That 1 per cent. is a steel steam schooner and loaded 25-5/8 inches below the Tropical Timber Load Line.

Fifth—That the average decrease in draft between Pacific Coast ports and the Panama Canal is 11.8542 inches.

Sixth—The average decrease in draft per day is 0.8913 inch.

We know definitely that these vessels suffered no damage when loaded to as much as 9-7/8 inches deeper than the Tropical Timber mark throughout the year, and that there is a known average safety margin of 3.932 inches in draft if the Tropical Timber Mark is used. How much more of a margin is present will probably never be known; but we can conclude from the absence of injury to life and property with the



The American steamship Lewis Luckenbach of the Luckenbach intercoastal line, with 8,012,000 board feet of lumber cargo. This is said to be a world record for lumber cargo in a single ship.

present practice of loading that the Tropical Timber Mark is amply safe.

The Caribbean Sea has a season of hurricanes during which it can be argued that lighter loading might be advisable. There is a decrease in draft of practically 11½ inches from Pacific Coast ports to the Canal and another 2 inches before the hurricane area is reached, which would bring the vessel up out of the water about 13½ inches. A decrease in draft of 13½ inches would obliterate all of the Tropical Timber Freeboard allowance and 6½ to 7½ inches of the Summer Timber allowance, thereby bringing the vessel to a draft 6½ to 7½ inches less than she is permitted to load throughout the entire year from the Panama Canal by the new rules. In other words, the vessel can take fuel at the canal eastbound of such an amount as would increase her draft 6½ to 7½ inches and still be within the permissible loading draft upon leaving there. Furthermore, the double bottom can be filled with salt water to bring the vessel down to the draft when she left the Pacific Coast and thereby regulate the stability.

Should the use of the Tropical Timber Freeboard allowance not be correct it can easily be changed; but it will be very much more difficult to increase it than to decrease it after it is once established.

No claim is made that the present ship will be economical with respect to speed and power for the reason that it is not designed to float at a draft 21 inches deeper; but new ships with the underwater body properly shaped to suit the conditions would prove that the development has real merit. Also this allowance will bring the large vessels down to about the limit of practical draft for Pacific Coast harbors at low tide.

Best Intercoastal Types

The application of the new load lines raises a question regarding the types of vessels applicable to the intercoastal trade. For the Grade A cargoes westbound (that is, light cargoes carrying a high freight rate) the three-deck ship with the strength carried to the upper deck seems to be the best. Such a ship should be of light scantlings with a tonnage opening to the upper tween deck and should be fitted with a forecastle. The steering gear should be placed on the upper deck in a deck house to avoid taking up space below deck. The hatches should be about 26 to 28 feet long on the weather deck and about one-third of the beam of the ship or less in width. The hatches to the first deck below should be two frame spaces longer and on the second deck below four frame spaces longer to provide means for getting lumber below. The hatches should be placed closer to one end of the hold and should have a set of winches and booms at each end of the hatch. The beam of the ship should be greater than the present practice to provide stability, and the double bottoms should be carefully designed to provide stability when needed and by means of free surfaces of oil and water to take away excess stability when loaded with light cargoes. Such a vessel could carry a fair deck load of lumber and, by consultation with the assigning authority, may be permitted to enjoy some of the benefits of the timber load lines. The mast partners, ventilators, and derrick posts if fitted should be housed in a casing within the line of the hatches to leave the deck clear between the hatch coamings and the ship's side. The wing stowage could then be completed and lashed and the center stowage over the hatches dropped in afterwards.

For the Grade "B" cargoes (that is, the heavy cargoes) the three-island ship is probably the best having two decks with hatches in the lower deck longer than on the weather deck. Such a vessel would have erections covering 0.6 of the length of the ship as this percentage gives a little more carrying capacity for the ship, as will be seen by referring to the article in the November, 1930, Pacific Marine Review.

A deck load 16 to 19 feet above the deck should be used and the beam of the ship regulated to give sufficient stability eastbound. Considerable care should be used in the design of the new vessels to provide against mistakes that would shake the faith of the owners, shippers, and underwriters; and the ships should be furnished with all necessary stability data in such simple form as to be readily understood by the masters. The lumber skippers have the knowledge now but their knowledge is not easily communicated to masters that have no experience carrying lumber deck loads.

Overcoming Fog Hazards

A NEW method of sending out fog warning signals has been devised by the United States Lighthouse Service which permits fog-bound vessels to determine their distance from the lighthouses or lightships whose signals they can hear through the fog. After nearly two years of experimenting, both at the Virginia Capes and on the Great Lakes, the Lighthouse Service of the Department of Commerce now plans to make such signal service a regular part of the work of four additional lighthouses on the Lakes when navigation opens in the spring.

The overcoming of the fog handicap, which frequently disrupts the sailing schedules of hundreds of vessels or introduces a serious hazard in their navigation, has been attempted in many ways, the new distance-finding means serving as an additional aid. Its method of operation is quite simple, requiring no intricate calculations, merely the possession of an ordinary radio receiving set or a radio-compass.

The lighthouse or lightship sending distance finding signals is equipped both with a radio-beacon and a fog signal which sounds in air, such as a siren or diaphone. Both of these pieces of equipment are in regular use at the more important stations. At regular intervals, while the radio-beacon is broadcasting its usual code signal, a long dash is sent. The radio operator or observer aboard ship listens for this long dash, noting the exact second on which it terminates. With the termination of the radio broadcast dash the fog signal sounds a blast, but as sound signals travel comparatively slowly through the air, it is usually a few seconds before the signal is heard aboard the observing ship. By counting the number of seconds in this interval, the distance between the ship and the sending station is easily determined, for the speed at which sound travels is known.

During the past summer three stations on the Great Lakes were equipped to send such distance-finding signals, and mariners who observed the working of the signals during test periods commented very favorably upon them. These stations were at Whitefish Point in Lake Superior, near the entrance to the St. Mary's River; Detour Light Station, Lake Huron, at the opposite end of the St. Mary's River; and at Manitou Island, Lake Superior. Plans are now being made to begin the operation of such signals at as many as four other stations with the opening of navigation in the spring.

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[illegible]ANSITING PANAMA CANAL WITH LUMBER DECKLOADS FISCAL YEARS 1928 1929 1930

NO.	DATE [illegible]	LENGTH	BREADTH	DEPTH	EXTREME DEPTH TO FREEBOARD	ASSIGNED SUMMER FREEBOARD	ASSIGNED SUMMER DRAFT	AUTHORITY	LUMBER TIMBER ALLOWANCE	LUMBER TIMBER FREEBOARD	LUMBER TIMBER DRAFT	TROPICAL TIMBER ALLOWANCE	TROPICAL TIMBER FREEBOARD	TROPICAL TIMBER DRAFT	SAILING DRAFT	DIFFERENCE +	CANAL DRAFT	DECREASE IN DRAFT TO BALBOA	TONS PER INCH IMMERSION	TOTAL FUEL AND WATER TO BALBOA	FUEL AND WATER PER DAY	TIME ON VOYAGE TO BALBOA
		FEET	FEET	FEET	FT IN	FT IN	FT IN		INCHES	FT IN	FT IN	INCHES	FT IN	FT IN	FT IN	INCHES	FT IN	INCHES	TONS	TONS	TONS	DAYS
1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R	14	[illegible]	[illegible]	6281	4 7¾	25 7¾	25-11½	+3¾	25 0	11 59	458	531	425	12½
2	[illegible]	[illegible]	[illegible]	[illegible]	24 [illegible]	4-[illegible]	[illegible]	L	[illegible]	[illegible]	[illegible]	5365	[illegible]	[illegible]	21 10⅞	[illegible]	20 9	13 35	330	441	315	14
3	[illegible]	[illegible]	462	[illegible]	[illegible]	6 4[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27 11¼	+2¾	[illegible] 0	11 62	458	532	380	14
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20 4¼	+2¼	19-1	15 43	262	409	303	13½
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R	[illegible]	[illegible]	[illegible]	[illegible]	4 1¼	25-10⅞	26 3¼	+5	25 5	10 37	458	475	380	12½
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	25 9¼	25 9¼	+0	24 10½	10 79	458	494	380	13
7	[illegible]	[illegible]	[illegible]	[illegible]	30 [illegible]	6 8	[illegible]	R	[illegible]	5 6¼	24 [illegible]	6161	5-0	25 2	25-2¾	+¾	24 2¼	12 32	411	506	375	13½
8	[illegible]	[illegible]	543	272	29 11	[illegible]	24 1	R	14	4 8¼	25 3	6312	4 2¼	25-9¼	26 ¼	+8	25 6	11 20	458	513	380	13½
9	[illegible]	3240	462	[illegible]	28 8	5 9	22 11	R	12¾	4 8¾	23 11¾	5987	4 2¾	24-5¾	24 9	+2¾	23 8	12 00	315	378	280	13½
10	[illegible]	2890	441	190	21 9½	2 8½	19 1	L	6¾	2 1¾	19-7¾	4909	1-9	20 0½	20-3¾	+3¾	19 0	15 86	261	414	345	12
11	[illegible]	4147	557	319	34 10½	7 4½	27 6	R	13½	6-3	28 7¼	7151	5-7¾	29-2¾	29-4¾	+2	28 3	12 40	462	573	410	14
12	10 19 27	3900	[illegible]	270	30-4	6 2	24 2	L	14¼	4 11	25-4	6336	4 5	25-10½	25-11¾	+1¼	25 0	11 91	399	475	380	12½
13	10 27 27	3240	462	250	28-8	5-9	22-11	R	12¾	4 8¾	23 11¾	5987	4 2¾	24 5¾	25 0	+6¼	24 0	12 00	315	378	280	13½
14	10 31 27	3240	462	250	28-8	5-9	22 11	R	12¾	4-8¾	23 11¾	5987	4 2¾	24-5¾	24-8¾	+3	23-3	12 43	315	392	280	14
15	11 6 27	3240	462	250	28-8	5-9	22 11	R	12¾	4 8¾	23 11¾	5987	4 2¾	24-5¾	24 8¼	+2¾	23 9	11 11	315	350	280	12½
16	11 9 27	3868	522	274	30 2	6 8	23 6	R	13¾	5 6¼	24 7¾	6161	5-0¼	25-1¾	25 5¼	+3⅜	24 4	13 24	411	544	375	14½
17	11 14 27	3240	462	250	28-8	5 9	22 11	R	12¾	4 8¾	23 11¾	5987	4-2¾	24-5¾	24-9¼	+3¾	23 10½	10 66	315	336	280	12
18	12 21 27	3600	532	270	29 6	5-9	23 9	R	13½	4 7½	24 10¼	6224	4 1	25-5	25-8½	+3½	24 9	11 46	425	487	375	13
19	1 2 28	3868	522	274	30-2	6-8	23-6	R	13¾	5-6¼	24 7¾	6164	5-0	25 2	25 5¾	+3¾	24-6	11 41	411	469	375	12½
20	1 8 28	4095	542	274	30 5	6 4½	24 0½	R	14	5-2½	25-2½	6302	4 8½	25-8¾	26 0	+3½	24 10½	13 53	458	620	400	15½
21	[illegible] 28	4097	542	277	30 4½	6-4½	24 0	R	14	5 2½	25-2	6292	4 8¼	25-6½	25-7¾	-⅛	24-9	10 78	458	494	380	13
22	1 21 28	3240	462	250	28-6	5-9	22 11	R	12¾	4 9¾	22-11¾	5987	4 2¾	24-5¾	25-0½	+7¼	24-0	12 44	315	392	280	14
23	2 7 28	4105	543	272	29 11½	5 10½	[illegible]	R	14	4-8½	25 3	6312	4-2½	25-9¼	25 11½	+2	25 0	11 20	458	513	380	13½
24	[illegible] 28	[illegible]	541	[illegible]	[illegible]	6-[illegible]	[illegible]	R	14	4 10	25-1½	6281	4 3¾	25-7¾	26-2½	+6¾	25 3	11 13	458	510	425	12
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	+3	21 3	11 20	458	513	380	13½
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24 5¾	24 5½	+¾	23 [illegible]	11 [illegible]	315	364	280	13
27	[illegible]	[illegible]	[illegible]	272	29 11½	5 10½	24 1	R	14	4 8½	25 3	6312	4 2½	25 9¼	26 0¼	+3	25 1	11 20	458	513	380	13½
28	[illegible]	3240	462	250	28 8	5 9	22 11	R	12¾	4 8¾	23 11¾	5987	4 2¾	24-5¾	24-9¼	+4¼	23-10	11 55	315	364	280	13
29	[illegible] 28	4101	541	272	29 11½	6 0	23 11¼	R	14	4-10	25 1½	6281	4 3¾	25-7¾	25 8¾	+¼	24 9	11 60	458	531	425	12½
30	[illegible] 28	3868	522	274	30 2	6-8	23-6	R	13¾	5 6¼	24 7¾	6161	5 0¼	25-1¾	25-1¾	-⅛	24 1	12 32	411	506	375	13½
31	3 16 28	4105	543	272	30 0	5 10	24-2	R	14	4-6	25 4	6333	4 1¾	25 10¾	25-10	-¾	25 0	9 96	458	456	380	12
32	3 27 28	3217	500	216	24 11¾	4 6¾	20 5	R	12¼	3 6¼	21-5¼	5365	3 0¾	21 10¾	22-6	+7¼	21-6	11 93	330	394	315	12½
33	4 [illegible] 28	3240	462	250	28-8	5-9	22-11	R	12¾	4 8¾	23-11¾	5987	4 2¾	24-5¾	24 11½	+6¼	23-11½	12 00	315	378	280	13½
34	4 7 28	3868	522	274	30-2	6-8	23 6	R	13¾	5-6¼	24-7¾	6164	5-0	25-2	25 4¾	+2¾	24 5	11 40	411	469	375	12½
35	4 12 28	4095	542	274	30 5	6 4½	24 0½	R	14	5 2½	25-2½	6302	4 8¼	25-8¾	26-4¾	+8¼	25-6	10 92	458	500	400	12½
36	4 21 28	4098	542	292	32-1	6 6	25 7	R	13¾	5-4½	26-8¾	6682	4-9¾	27-3⅜	27-9	+5⅝	26 8½	12 52	458	574	425	13½
37	5 4 28	4147	557	319	34 10½	7 4½	27 6	R	13½	6-3	28-7¼	7151	5 7¾	29-2¾	29-6¾	+4	28-3½	15 08	462	697	410	17
38	5 14 28	3240	462	250	28-8	5-9	22 11	R	12¾	4-8¾	23-11¾	5987	4-2¾	24-5¾	24-5¼	-½	23-6	11 11	315	350	280	12½
39	5 16 28	3240	462	250	28 8	5-9	22-11	R	12¾	4-8¾	23 11¾	5987	4 2¾	24 5¾	24-5	-¾	23-5½	11 56	315	364	280	13
40	5 19 28	4100	544	272	29 11¼	6 0	23 11¼	R	14	4-10	25 1½	6281	4-3¾	25-7¾	25-7⅝	-⅛	24-8	11 60	458	531	425	12½
41	5 20 28	4100	542	276	30 6½	6 6½	24-0	L	14	5-4½	25-2	6292	4 10¼	25-8½	25-11	+2½	25 1	9 96	458	456	380	12
42	5 26 28	3240	462	250	28-8	5-9	22 11	R	12¾	4 8¾	23-11¾	5987	4 2¾	24-5¾	24-7½	+2¼	23-7½	12 00	315	378	280	13½
43	5 27 28	4105	543	272	29 11½	5 10½	24 1	R	14	4 8½	25 3	6312	4 2½	25 9¼	25-11¾	+2½	25-0½	11 20	458	513	380	13½
44	5 27 28	3240	462	250	28 8	5 9	22 11	R	12¾	4 8¾	23-11¾	5987	4 2¾	24-5¾	25-1	+7¼	24-1½	11 56	315	364	280	13
45	6 3 28	4665	585	322	35-0	7-10½	27 1½	R	13¾	6 9⅝	28 2⅞	7060	6-2¼	28 9¾	29-3¾	+5¾	28-6	9 62	553	532	425	12½
46	6-5 28	3764	523	270	29 9½	5 10½	23 11	L	13½	4-9	25-0½	6260	4 7¾	25-6¾	25-7¾	+1	24-9	11 12	400	469	375	12½
47	6 5 28	4506	572	340	37-1	9-9	27 4	R	14¾	8-6¾	28-6⅝	7138	7-11¼	29-1¾	29-2¼	+½	28-10	4 23	540	228	190	12
48	6 13 28	3240	462	250	28-8	5-9	22 11	R	12¾	4 8¾	23-11¾	5987	4-2¾	24-5¾	25-2¼	+8½	24-0	14 22	315	448	280	16
49	6 14 28	4096	541	271	29 11½	5 10	24 1½	R	14	4-8	25 3½	6323	4 1⅞	25-9⅞	26-1	+3⅛	25-0	13 03	458	597	385	15½
50	6 19 28	4105	543	272	30 0	5 10	24-2	R	14	4-8	25-4	6333	4-1⅞	25-10⅞	26-2¼	+3⅜	25-3	11 20	458	513	380	13½
51	6 25 28	2890	441	190	21 9½	2 8½	19-1	L	6¾	2-1¾	19-7¾	4909	1-9	20-0½	20-5⅞	+5¾	19-0	17 83	261	466	345	13½
52	7 6 28	3240	462	250	28-8	5-9	22 11	R	12¾	4 8¾	23 11¾	5987	4-2¾	24 5¾	24-8¼	+3¼	23-8½	12 00	315	378	280	13½
53	7 16 28	3240	462	250	28 8	5-9	22-11	R	12¾	4-8¾	23 11¾	5987	4-2¾	24-5¾	24-5½	-¼	23-6	11 12	315	350	280	12½
54	7 21-28	3240	462	250	28-8	5 9	22-11	R	12¾	4 8¾	23 11¾	5987	4-2¾	24-5¾	25-1½	+8¼	24 1½	12 00	315	378	280	13½
55	7 [illegible] 28	[illegible]	542	274	30 5	6 4½	24-0½	R	14	5 2½	25-2½	6302	4 8½	25-8¾	26-1¾	+5	25-1½	12 22	458	560	400	14
56	8-17 28	3240	462	250	28-8	5-9	22 11	R	12¾	4 8¾	23 11¾	5987	4-2¾	24 5¾	24-4¼	-1½	23-5	11 12	315	350	280	12½
57	9 8-28	3848	512	273	30-10	6-10	24 0	L	14¼	5-7¾	25-2¼	6294	5-1⅜	25-8¾	25-7¾	-⅞	24-6	13 72	401	550	440	12½
58	9 30 28	3240	462	250	28-8	5-9	22-11	R	12¾	4 8¾	23-11¾	5987	4 2¾	24-5¾	24-6¾	+1	23-5	13 33	315	420	280	15
59	10 6 28	4105	543	272	29-11½	5 10	24 1½	R	13¾	4 8¾	25-2¾	6310	4 2¾	25-9½	26-3½	+6¾	25-5½	9 96	458	456	380	12
60	10 11 28	4096	541	271	29 11½	5 10	24 1½	R	14	4 8	25-3½	6323	4-1⅞	25-9⅞	26-7¾	+9⅞	25-7½	12 19	458	558	385	14½
61	11 2 28	3240	462	250	28-8	5 8	22 11	R	12⅞	4-8⅞	23 11⅞	5987	4-2⅞	24 5⅞	24-6	+⅛	23-6	12 00	315	378	280	13½
62	11 29 28	2890	441	190	21-9	2-9	19 0	L	6⅞	2-2⅞	19-6⅞	4888	1-9⅞	19-11⅞	19-10⅞	-⅞	18-5	17 85	261	466	345	13½
63	12 2 28	4100	541	272	29 11½	6-0	23 11½	R	14	4-10	25-1½	6281	4 3¾	25-7¾	26-2¼	+6½	25-3	11 59	458	531	425	12½
64	12 6 28	2890	441	190	21 9½	2 8½	19-1	L	6¾	2-1¾	19 7¾	4909	1-9	20-0½	20 5¾	+5¼	19-0½	17 18	261	448	345	13
65	1 1 29	3240	462	250	28-8	5-9	22-11	R	12¾	4-8¾	23 11¾	5987	4 2¾	24-5¾	25-1	+7¼	24-0½	12 44	315	392	280	14
66	1-4 29	3240	462	250	28-8	5-9	22-11	R	12¾	4-8¾	23-11¾	5987	4-2¾	24-5¾	24-6	+¼	23-6	12 00	315	378	280	13½
67	1 22 29	3868	522	274	30-2	6-8	23-6	R	13⅞	5 6⅞	24-7⅞	6164	5-0	25-2	25-0⅞	-1⅛	24-1	11 66	411	488	373	13
68	2 7 29	3240	462	250	28-8	5-9	22-11	R	12¾	4-8¾	23 11¾	5987	4-2¾	24-5¾	24-7¾	+2¼	23-9	10 66	315	336	280	12
69	2 8 29	3900	542	276	32-2	7-10	24-4	L	12¾	6-9¼	25-4¾	6352	6-2¾	25-11¼	26-7¾	+8¼	26-3½	4 35	435	189	140	13½
70	2 18 29	3338	480	249	27 8	5-2	22-6	R	12¾	4-1⅜	23-6⅜	5883	3-7¾	24-0⅛	23-11⅜	-1⅜	22-10	13 14	325	427	356	12
71	3 3-29	3240	462	250	28-8	5-9	22 11	R	12¾	4-8⅝	23 11⅝	5987	4-2⅝	24-5⅝	24 11⅛	+5⅜	24-0	11 12	315	350	280	12½
72	3-3 29	4105	540	271	29-11½	5 9½	24 2	R	14	4-7½	25-4	6333	4-1⅞	25-10⅞	25-10¾	+⅛	25-0	10 78	456	494	380	13
73	3 16-29	3240	462	250	28-8	5-9	22 11	R	12⅞	4-8⅞	23-11⅞	5987	4-2⅞	24-5⅞	24-10⅞	+5¼	24 0	10 67	315	336	280	12
74	5 2-29	3868	522	274	30-2	6-8	23-6	R	13⅞	5-6⅞	24 7⅞	6164	5-0	25-2	25-1⅛	-⅞	24 2½	11 41	411	469	375	12½
75	5 2 29	4105	543	272	29 11½	5 10½	24-1	R	14	4-8½	25-3	6312	4-2½	25-9¼	26-4¾	+7⅛	25-5	11 62	458	532	380	14
76	5 4 29	3764	523	270	29-9½	5-10½	23 11	L	13½	4-9	25-0½	6260	4-2⅞	25-6¾	25-8¼	+1½	24-9	11 25	400	450	375	12
77	5 22-29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23 11⅞	5987	4 2⅞	24-5⅞	24-6	+⅛	23-6	12 00	315	378	280	13½
78	6 26 29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23 11⅞	5987	4 2⅞	24-5⅞	24-4½	-⅞	23-5	11 55	315	364	280	13
79	7 5 29	3240	462	250	28-8	5 9	22-11	R	12⅞	4 8⅞	23-11⅞	5987	4-2⅞	24-5⅞	25-0	+6⅛	24-0	12 00	315	378	280	13½
80	7-5-29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23-11⅞	5987	4-2⅞	24-5⅞	24-5	-⅞	23-5	12 00	315	378	280	13½
81	7 6-29	4372	637	337	37-7½	9-1½	28-6	L	14¼	7-11¼	29-6¼	7422	7-3⅞	30-3⅞	30-3⅞	+½	29-6	9 81	585	574	410	14
82	8-3-29	4097	542	277	30-4½	6-4½	24-0	R	14	5-2½	25-2	6292	4-8¼	25-8¼	25-8½	+0	24-9	11 20	458	513	380	13½
83	8-8 29	3848	512	273	30-10	6-10	24-0	L	14¼	5-7¾	25-2¼	6294	5-1⅜	25-8¾	25-10¼	+2⅛	24-6	16 46	401	660	440	15
84	9-7-29	4096	541	271	29-11½	5-10	24-1½	R	14	4-8	25-3½	6323	4-1⅞	25-9⅞	26-1⅞	+3⅝	25-2	11 76	458	539	385	14
85	9-12-29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23-11⅞	5987	4-2⅞	24-5⅞	24-5¼	-⅜	23 6	11 11	315	350	280	12½
86	10-9 29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23-11⅞	5987	4 2⅞	24-5⅞	24-5	-⅞	23-5	12 00	315	378	280	13½
87	11 4-29	4105	543	272	30-0	5-10	24-2	R	13¾	4-8¾	25-3¾	6320	4 2¼	25-9¾	25-9¾	+0	24-11	10 76	456	494	380	13
88	11-5 29	3240	462	250	28-8	5-9	22-11	R	12⅞	4-8⅞	23-11⅞	5987	4 2⅞	24-5⅞	24-4½	-1⅜	23-5	11 11	315	350	280	12½
89	11 6 29	4105	543	272	29 11½	5-10½	24-1	R	14	4-8½	25-3	6312	4-2½	25-9¼	25-11¼	+2	25-0	11 20	458	513	380	13½
90	11 22 29	4098	542	277	30-6½	6 6½	24-0	L	14	5-4½	25-2	6292	4-10¼	25-8¼	25-10¾	+2½	25-0	10 78	458	494	380	13
91	12-2-29	3240	462	250	28-8	5-9	22 11	R	12⅞	4-8⅞	23-11⅞	5987	4-2⅞	24-5⅞	24-6	+⅛	23-6	12 00	315	378	280	13½
92	1-2-30	4096	541	271	29-11½	5-10	24-1½	R	14	4-8	25-3½	6323	4-1⅞	25-9⅞	26-1⅜	+3½	25-2½	10 92	458	501	385	13
93	1-5-30	4095	542	274	30-5	6-4½	24-0½	R	14	5-2½	25-2½	6302	4-8½	25-8¾	25-10¾	+2¼	25-0	10 92	458	500	400	12½
94	1-24-30	4097	542	277	30-4½	6-4½	24-0	R	14	5-2½	25-2	6292	4 8¼	25-8¼	25-11¾	+3½	25-0	11 62	458	532	380	14
95	2-11-30	4105	543	272	29-11½	5-10½	24-1	R	14	4-8½	25-3	6312	4-2½	25-9¼	25-11¼	+2	25-0	11 20	458	513	380	13½
96	3-2 30	4097	542	277	30-4½	6-4½	24-0	R	14	5-2½	25-2	6292	4-8¼	25-8¼	25-10¾	+2½	25-0	10 37	458	475	360	12½
97	3-11-30	3804	531	270	29-9	6-0	23-9	L	13½	4-10½	24-10½	6224	4-4	25-5	25-4⅛	-⅞	24-0	16 32	425	694	375	18½
98	3-15-30	4100	542	275	30-4	6-5	23-11	R	14	5-3	25-1	6271	4-8¾	25-7¼	25-5¾	-1½	24-6	11 78	458	540	400	13½
99	3-30-30	4098	542	292	32-1	6-6	25-7	R	13⅞	5-4½	26-8¾	6682	4-9⅞	27-3⅜	27-7⅞	+4½	26-6	13 45	458	616	425	14½
100	6-8-30	4097	542	277	30-4½	6-4½	24-0	R	14	5-2½	25-2	6292	4-8¼	25-8¼	26-5¼	+9	25-6	11 20	458	513	380	13½

1930 (*) R-AMERICAN BUREAU OF SHIPPING L-LLOYDS REGISTER V-BUREAU VERITAS

David W. Dickie

Table of official measurement of drafts of vessels with lumber deck load, showing increase of freeboard on voyages from Pacific Coast ports to Balboa, and proving that present Pacific Coast loading practice is safe for tropical or Caribbean conditions.

Improving Marine Boiler Tube Experience

Showing How Operating Costs can be Reduced by the Installation of Quality Tubes and by Careful Operation and Maintenance

By Lieutenant C. A. Griffiths, U. S. Navy

THE Technical report of the British Boiler and Electrical Insurance Company for 1928 lists a total of 192 major casualties to marine boilers during the forty-five-year period from 1882 to 1927 inclusive. A total of 188 deaths resulted from these casualties. The causes for the boiler failures as given in the report are as follows:

Causes of casuality	Number	Percentage
Deficiency of water	82	42.6
Deposits	44	22.8
Corrosion	34	17.7
Excessive pressure	13	6.8
Structural weakness	5	2.6
Failure of stays	4	2.2
General deterioration	4	2.2
Not ascertained	6	3.1
	192	100.0

The foregoing is illuminating in that it shows the three largest classes of failures, amounting to 83.1 per cent. of the total, to be due to lack of water, accumulation of deposits, and corrosion, named in the order of their magnitude. As features of design and construction account for only 4.8 per cent. of the total boiler casualties, the majority of the failures must, therefore, be attributed to the boiler operation or maintenance.

Boiler design has kept pace with modern high pressures and temperatures required in the fight for better fuel economy. As the complexity of a boiler increases so do the ill effects that attack the fuel consumption and the safety of the boiler. The difficulties encountered with low pressures and low temperatures are negligible when compared to those encountered with the modern high pressure installation. Good operating practice not only includes safety of the apparatus in the ship but the efficient management of it as well. By the better management of an inefficiently operated plant, the safety of the plant as well as the fuel economy will be increased. Application of approved methods of operation and the practice of good engineering principles will reduce the hazards to which a boiler is exposed. When this is accomplished the saving will be reflected both in the cost of maintenance and the safety of the boiler.

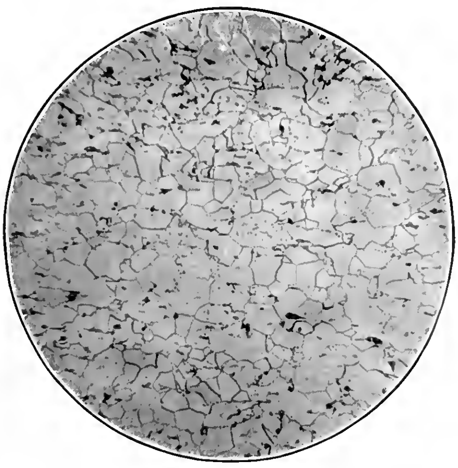


Fig. 1.

Tube Manufacture

As a chain is strongest only in its weakest link, so is a boiler safest only in so far as its weakest tube is safe. Tubes, therefore, offer the first hazard to be overcome in the design of high pressure, high temperature steam boilers. Advancements in the art of tube manufacture have developed the seamless tube, now the generally accepted tube for high-pressure, water-tube boilers. These tubes are manufactured from billets of homogeneous steel by either a hot rolling or a cold drawing process.

In the manufacture of the tubes the steel billets are first pierced, then rolled down to size in the hot rolling process or cold drawn down to size in the cold drawing process. When the tubes are cold worked strains develop in the metal, which, if not relieved, will greatly shorten the life of the tube by reducing its resistance to pressure and permitting intercrystalline corrosion. These strains are removed by annealing as a final step in the process of manufacture, which final anneal consists in heating the finished tube to about 1300-1400 degrees Fahrenheit and allowing it to cool slowly in air.

Heat Treatment

An iron without carbon possesses a large degree of ductility and can be easily worked, but it is comparatively low in tensile strength. A small amount of carbon added to this iron, and the metal given the proper heat treatment, will effect a compromise and while greatly increasing the tensile strength will still leave it considerable malleability. A boiler tube to withstand high pressures must have a high tensile strength; to permit securing it to the drum by rolling it must have ductility. The low carbon steel made by the open hearth process has so far proved suited to meet these fundamental requirements.

Different heat treatment results in different crystalline structure of the tubes. A fine grained tube structure as viewed under a high power microscope is shown in Fig. 1. This tube is of good quality and has a minimum amount of slag, dirt, and other nonmetallic inclusions in the metal which would tend to weaken the tube. The structure is brought out by first giving the sample a high polish, then etching the polished surface with picric acid which eats into the metal between the grains and discloses the grain boundaries under high magnification. In this sample the nonmetallic particles are small in quantity and evenly distributed.

Fig. 2 shows a sample of polished tube which has not been etched to bring out the grain boundaries. In this tube there are excessive amounts of foreign matter and nonmetallic inclusions. These nonmetallic inclusions may be oxidized impurities in the metal from the refining process or they may result from the reaction products of deoxidizers. To a limited extent they

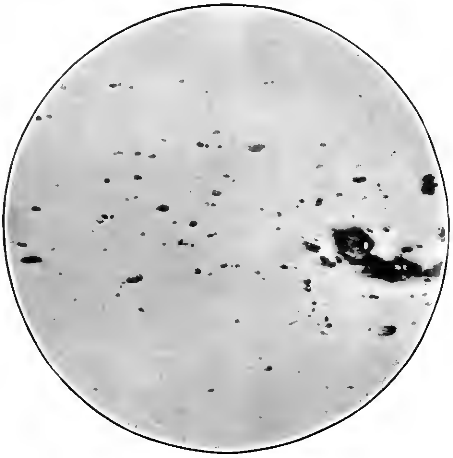


Fig. 2.

may also be due to small pieces of refractory materials becoming detached from the ladles or furnace.

Nonmetallic Inclusions

In most cast metal articles the center of the original billet remains the center of the finished object and to a certain extent the full effect of the segregated inclusions is not felt. In boiler tubes, however, the center of the billet becomes the inner wall of the tube and the nature of the piercing process is such that any serious quantity of nonmetallic inclusions will form the starting point for pits, laps, tears, slivers, and cracks. Consequently, in the manufacture of boiler tubes all steps are equally important if the finished product is to be satisfactory; from the original billet to the final anneal each process must be expertly performed.

When the finished tube has been inspected for surface imperfections, the dimensions checked, and the grain size determined from metallographic inspection, the tube is subjected to certain physical tests, the object of which is to verify the strength of the tube, its ductility, and malleability under various conditions. A test coupon cut from the end of a tube is flattened between parallel plates until the distance between the plates is not over three times the wall thickness of the tube. Another coupon is expanded cold to 1-1/6 times its original diameter. On another coupon a flange is turned, equal in width to 1/8 of the tube diameter. All the tubes are subjected to a hydrostatic pressure and under none of these tests can defects or weaknesses appear. The art of tube manufacture has progressed to such a degree that tubes are made which can meet these stringent tests and requirements with a corresponding lengthened tube life.

Operation Progress

As the process of tube manufacture has advanced with newer design of boilers, so must operation and upkeep likewise progress in order to protect these more costly boiler parts. Guided by the previously mentioned report of casualties, it is safe to say that the one most important factor entering into boiler safety and life of the boiler tubes is the quantity and quality of the feed water. Were it not for the continual flow of water through the tubes the heat of the furnace, 2400-3000 degrees, would quickly melt the tube metal. The safety of the boiler, therefore, depends on an uninterrupted passage of water through the tubes.

Fig. 3 illustrates the effects of insufficient water; a ruptured tube. An analysis of the scale on the interior of the tube showed it to be practically all iron oxide. When water is passed over red hot iron, scale of this character is formed. That the tube ruptured in the locality shown is probably due to the tube wall being slightly thinned at this spot by local corrosion. What probably happened was a deficiency in water for a short period of time; then water again entered the tube, which had become red hot, and a heavy oxide formed which further weakened the tube. Weakened to this extent the tensile strength of the metal was insufficient to withstand the pressure and the tube carried away. That only this tube out of the large number in the nest ruptured may indicate a temporary obstruction in the tube. Tubes adjacent to the one shown were not burned or warped as would probably be the case had the water in the boiler been allowed to fall.

Fig. 4 shows two failed tubes, failure being due to corrosion of the tubes on the water sides. As water in the tubes is vaporized into steam impurities in the feed are deposited on the tube walls. These impurities build up gradually in layers of egg shell thinness while at the same time oxidation of the tube metal continues. As these products of corrosion increase in thickness they increase the thermal resistance which the heat of the furnace must overcome to reach the water in the tube and thereby permit local hot spots to develop. When by this continued action the thickness of the tube wall has been reduced to the point where its strength will not hold the pressure within the boiler, the tube will blister or bulge or finally rupture. In the figure the eating away of the tube is plainly discernible.

Feed Water Conditioning

Boiler water conditioning is one of the most important problems of the marine chief engineer. The impurities found in boiler water received from sources ashore vary with the localities from which they come. In general these impurities consist of two classes; those in suspension in the water and those in solution. Unlike the chief engineer of a shore power station, the marine engineer cannot study the local water conditions and prepare suitable chemical reagents to offset the effects of the impurities. As the ship must travel in many different waters and receive waters from ports throughout the world, the problem must

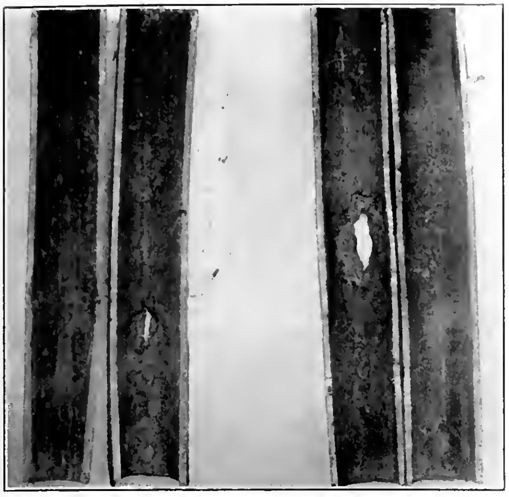


Fig. 4.

be approached by attempting to combat only the larger impurities.

Suspended matter can be removed from boiler feed by filtration and to remove these particles the feed system is equipped with a filter tank in which luffa sponges arrest the suspended particles while allowing the water to pass. Luffa sponges do not entirely remove all suspended particles but they will prevent the admission of larger particles and will hold non-emulsifying oils and greases. Foreign matter in solution in boiler feed is partially removed by treating the boiler water with certain chemicals. These chemicals, soda ash, tannin, caustic soda, etc., precipitate certain scale forming salts which have been held in solution. The precipitated impurities are light and porous and can be removed by blowing down or, if the boiler is dumped, will not adhere too firmly to be easily removed from the metal surfaces.

Pure Feed Water must be Kept Pure

With boiler feed properly treated with compounds and luffa sponges kept in a state of cleanliness, the next step in the treatment of feed water is to attack impurities at the points of admission. Corrosion of iron and steel is due to the admission of sea water, the presence of acids, and the presence of air. Oil in the feed water will coat the boiler tubes and allow the formation of local hot spots. Certain oils will sludge and others after working produce an acid reaction.

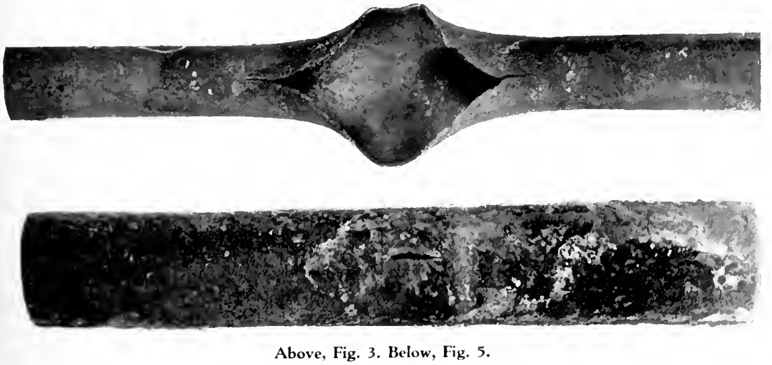
In his preventative measures, the chief engineer must make sure that all possible sources for the entrance of sea water are effectively blocked. He must see that the lubricating oil he is using has a neutral reaction and must prevent the admission of acids into the feed from other sources. The formation of iron oxides must be prevented by deaerating the feed water either in open feed heaters or in the hot well.

When dry steam is generated in a boiler, all of the dissolved impurities in the feed water remain in the boiler. The purest feed water obtainable must therefore be used. To illustrate the rapidity with which these solids accumulate, assume for example that a 10-knot 2000-shaft horsepower vessel filled her reserve feed tanks with water containing 4 grains of scale forming impurities to the gallon. On a 30-day trip, if the engines used 15 pounds of steam per shaft horsepower per hour, the boilers would evaporate 30,000 pounds, or approximately 3800 gallons per hour. With a tight plant, the make up feed would amount to approximately 5 per cent of the water evaporated, which in this case would amount to 190 gallons per hour. During the thirty-day trip the total make-up feed used would amount to 30 x 24 x 190 136,800 gallons. With 4 grains of impurities to the gallon there would be deposited in the steaming boilers, 136,800 x 4 547,200 grains. At 7000 grains per pound this would amount to 78.2 pounds of scale forming impurities which would have to be removed at the end of the trip.

Clean Fireside Important

Fig. 5 shows a failed tube which resulted from external scale deposits on the tube. A chemical analysis of the scale which formed on the fireside of the tube showed a large percentage of iron oxide and some iron sulphate. The formation of iron oxide was probably due to dampness combining with the dirt on the tubes. The iron sulphate indicated the presence of sulphur in the fuel oil. Corrosion ate into the metal of the tube until the wall thickness was insufficient to withstand the pressure from within, and the tube carried away. Had better care and greater attention been paid to the cleaning of the boiler the probability is that the life of this tube would have been greatly lengthened.

The importance of clean fire sides cannot be over emphasized. Not only does the heat of the fire encounter a greater thermal resistance through the dirt and scale which it must overcome before it reaches the water within the tube, but local overheating of the tube, which will alter the grain structure and reduce its strength, will also result. The important part played by boiler tubes in the marine steam plant cannot be underestimated. They are the lungs of the installation where the steam is generated, and they must be treated accordingly.



Above, Fig. 3. Below, Fig. 5.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

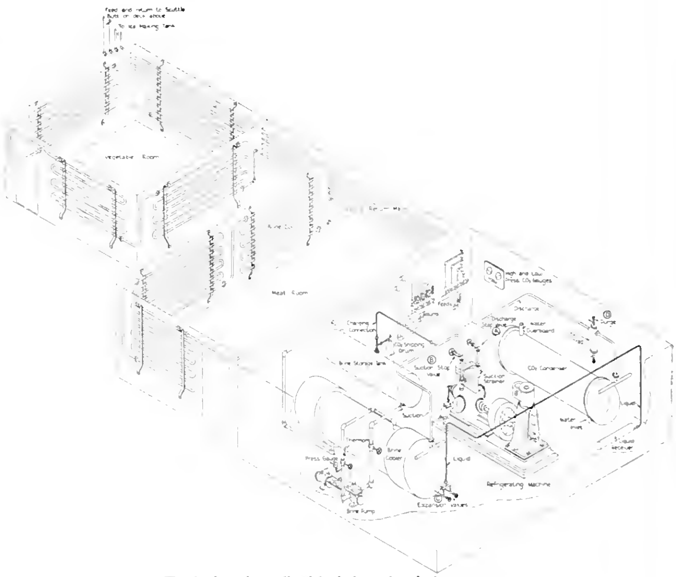
Part IV—Choice of System

By L. L. Westling

THE choice of a system for any particular installation is often but a matter of opinion of the ship's owner. There are, however, characteristics which make the various refrigerants particularly adaptable to certain applications. Size of apparatus is an important item. Space aboard ship is at a premium and in consequence the refrigerant requiring small units is advisable. The size of the compression equipment varies with the density of the gas. For this reason carbon dioxide systems meet with much favor. This system, however, requires a brine circulating system, which deducts from the saving as compared with direct expansion systems.

The ammonia system ranks second on space occupied, and if used in direct expansion a saving of space is effected over the carbon dioxide-brine plant.

The other commonly known refrigerants mentioned in the former chapter are not generally used in large marine plants. The low pressure types can, however, be reduced in size because of the fact that rotary and high speed compressors may be used. Plants using less than atmospheric pressure almost invariably have a concentrated grouping to facilitate few and rigid connections as a measure of preventing leakage of air into the system. This grouping necessitates brine circulation.



Typical carbon-dioxide brine circulation system.

Safety aboard ship, especially on large passenger ships, favors the use of carbon dioxide. Ammonia and many other refrigerants are injurious to human life, and in case of accident liberation of a large quantity of these gases may result in catastrophe. However, ammonia brine systems are common on passenger carrying vessels, the ammonia plant being confined to a small, protected portion of the machinery space. On freight ships direct expansion ammonia systems are becoming increasingly popular, firstly because of the low cost, and secondly because of the higher efficiency.

Cost of installation and operation are important factors. Direct expansion systems eliminate the need of brine coolers or evaporators, brine pumps, return sump tanks, and large diameter pipe lines and cooler coils, with the greater cost of pipe insulation. The elimination of an additional step in heat transfer—namely, gas to brine, and brine to chambers—permits of higher thermal efficiency. Likewise, a much higher suction pressure can be used which gives denser gas and higher efficiency in the compressor plant. The cost of maintaining the brine system is avoided, thereby reducing materially the operating costs.

For freight ship stores, the direct expansion ammonia system is most adaptable, and the machinery is usually located in close proximity to the chambers.

With small refrigeration requirements, such as are found in ships' pantries and bars, it is becoming the accepted method to install small automatic domestic plants. This obviates the necessity of installing long brine leads which subject the main brine plant to unnecessarily high working pressures or else require an independent brine circulator. In many cases the insulated brine leads have to be enclosed within panel work, which is not desirable. In using the small automatic plant, it is good practice to have two units, one as a stand-by.

Brine systems are higher in initial cost, lower in operating efficiency, and have higher maintenance costs, but there are other outstanding features that make their use advisable. In case of a compressor plant shutdown, the large quantity of cold brine in the system will absorb great quantities of heat. The continued circulation through the coils will result in a very slow drop in chamber temperatures. In the direct expansion system the liquid of the receiver is soon dissipated, the pressures equalize, and all refrigeration ceases. Brine acts as a thermal "flywheel" in refrigeration. In regular operation the flow of brine is very easily regulated and abrupt changes are not easily produced. The throttling of refrigerant liquids or gasses is harder to control than brine and require much closer supervision to prevent a greatly varying chamber temperature.

Brine may be made of sodium chloride (common salt) or of calcium chloride. The latter chemical, which is less corrosive, is more rapidly dissolved and is generally used.

Calcium chloride is the brine usually used aboard ship. The brine should not contain more calcium chloride than conditions require, as an excess might cause a precipitation of the solid matter in pipes and coils causing a sluggish or clogged system. Ammonia leaks to calcium brine should be prevented as it causes a sediment to precipitate in the system. Ammonia leaks in calcium chloride brine may be detected by drawing a sample and adding phenolphthalein indicator for the pink color test. Litmus paper will show a blue color test with either sodium or calcium brine. Herewith is a table showing calcium chloride brine characteristics.

Correction.—In the second installment of this article, published in the January issue of Pacific Marine Review, there appeared an illustration showing a typical wet and dry bulb thermometer. The caption under this illustration was in error. It should have read "Sling Psychrometer" and not "Sling Cyclometer."

Editorial Note

These articles by L. L. Westling are drawing much attention and comment. We wish again to impress on our readers the fact that Mr. Westling is writing to SIMPLIFY the theory, design, and application of refrigeration aboard ship. All tables of properties of refrigerants, insulating materials, and other factors are made as simple as possible to cover practical conditions in ship operation.

For instance, our attention has been directed by an authority to the fact that the conductivity of insulating materials, and particularly of granulated cork, changes very perceptibly over a range of temperatures and that Mr. Westling's table of this property, as published in the January Pacific Marine Review, would therefore be misleading. Mr. Westling, in common with every engineer who has had any large experience with insulation, knows very well that conductivity changes with temperature. He knows also that over the ordinary refrigeration range this change is very small and he has therefore made the table for the mean conductivity of this range of temperatures. As a matter of fact, in the practical job of figuring insulation, marine operating conditions throw so many variables into the picture that the application of the necessary safety factor far more than absorbs any slight variation of conductivity in the temperature range involved.

The figures and the facts set forth in this series of articles are those which have been found in operating experience to best meet marine refrigeration problems. These figures and facts are stated in simple language in the manner which the author has found best adapted for conveying his ideas and conclusions to the minds of marine operating personnel.

Suggestions and constructive criticism will be thankfully received.

Calcium Chloride ($CaCl_2$)

Degrees Baumé 60°F.	Specific Gravity 60°/60°F.	Degrees Salometer 60°F.	% $CaCl_2$ by Weight	Lbs. $CaCl_2$ per Gallon of Solution (Approx.)	Freezing Point °F.	Degrees Baumé 60°F.	Specific Gravity 60°/60°F.	Degrees Salometer 60°F.	% $CaCl_2$ by Weight	Lbs. $CaCl_2$ per Gallon of Solution (Approx.)	Freezing Point °F.
0	1.000	0	0	0	+32.	16.8	1.131	68	15	2½	12.2
1.	1.007	4	1		31.1	17.8	1.140	72	16		10.
2.1	1.015	8	2	.	30.4	19.	1.151	76	17		7.5
3.4	1.024	12	3	½	29.5	20.	1.160	80	18	3	4.6
4.5	1.032	16	4	. .	28.6	21.	1.169	84	19		+1.7
5.7	1.041	22	5	. .	27.7	22.	1.179	88	20		—1.4
6.8	1.049	26	6	1	26.6	23.	1.188	92	21	3½	4.9
8.	1.058	32	7	. .	25.5	24.	1.198	96	22	.	8.6
9.1	1.067	36	8	. .	24.3	25.	1.208	100	23		11.6
10.2	1.076	40	9	1½	22.8	26.	1.218	104	24	4	17.1
11.4	1.085	44	10	. .	21.3	27.	1.229	108	25	. .	21.8
12.5	1.094	48	11	.	19.7	28.	1.239	112	26		27.
13.5	1.103	52	12	2	18.1	29.	1.250	116	27	4½	32.6
14.6	1.112	58	13	.	16.3	30.	1.261	120	28	.	39.2
15.6	1.121	62	14	. .	14.3	31.	1.272	124	29	.	46.2
						32.	1.283	128	30	5	—54.4

Diesel Engine Lubrication

Part II. A Discussion of the Special Problems Involved in the Lubrication of Diesel Power Cylinders

By Arthur M. Tode

Diesel Engineer, Technical Department, The Texas Company

IN many diesel engine plants from two to four lubricating oils of different viscosities are being used to lubricate one type of engine. Recent tests have indicated that this condition can be eliminated in many cases, especially on small sized engines. Actual experience has proved that a lubricating oil may be suitable for the power cylinders, and yet not have a viscosity so high as to preclude its use on bearings. The same oil may also be suitable for air compressor use.

The selection of lubricants for a diesel engine plant or a motorship should be strictly on the basis of quality, involving chemical characteristics to insure properly refined oils containing no impurities, and on viscosity to insure proper grade. Neither oil color nor density signify as special properties in the selection of a lubricant. When light, medium, or heavy oils are mentioned, it is the viscosity which is indicated. Light means low viscosity and heavy means high viscosity. Excessive friction may result from the use of an oil of either too high or too low viscosity. Too high a viscosity will give a good film but the friction in the oil will be excessive. If the viscosity is too low the film may be broken. The physical characteristic viscosity is, therefore, of supreme importance in the selection of a lubricant as it is a measure of the ability of the oil to maintain the proper film under given conditions of speed, pressure and temperature.

Successful diesel engine cylinder lubrication is dependent on four factors; namely:

1. The use of properly refined oil.
2. Application of sufficient, though never excessive, amounts.
3. Delivery through oil-ways so located that the piston and rings will receive the maximum of this charge.
4. Application at exactly the right time.

Two-Cycle vs. Four-Cycle

Irrespective of whether a diesel is of the 4-cycle or the 2-cycle type, there is little, if any, difference with respect to the lubricating oil best suited for their power cylinders. As some of the lubricant in a 2-cycle engine cylinder is usually scraped off from the piston and piston rings while passing the scavenging and exhaust ports, the oil consumption is generally slightly higher than that of a 4-cycle engine of equivalent cylinder size. Too great an oil feed with 2-cycle engines is frequently a contributing cause of excessive deposits in the scavenging air ports and the exhaust ports.

In the 4-cycle engine there is not the heat developed during operation, nor is the lubricant on the cylinder walls subjected to the high velocity and vaporizing action of the exhaust gases as in the 2-cycle type. The difference in temperature is not, however, great enough to require special consideration in connection with cylinder lubrication. In the 4-cycle type of diesel the pressure is relieved during the second stroke. As a result the oil is more readily spread over the cylinder liner and materially facilitates the sliding action of the piston and rings during the subsequent strokes of the cycle.

The large double-acting, 2-cycle engine requires special consideration as far as cylinder, piston, and stuffing box are concerned because of the relatively large heat flow. Four-cycle engines add the complication of an elaborate valve gear, though even when double acting they do not have such severe heat conditions.

Piston Seal and Oil Film

The high pressure gases above the piston of a diesel engine are only prevented from leaking through between the piston and cylinder wall by properly fitted rings in conjunction with the lubricating film. The lubricating oil film must be maintained under two distinct conditions of operation; i.e., high temperature and high pressure. The higher the temperature of the products of combustion the hotter are the adjacent parts, and consequently the thinner the oil film separating the metal surfaces. The greater the gas pressure, the more difficult it is to maintain a lubricating film between the rubbing surfaces. The upper piston rings bear the brunt of these operating conditions.

Effect of Temperature on Oil Film

A large portion of the cylinder wall over which the piston passes is swept by flame every stroke in a 2-cycle engine, and every other stroke in a 4-cycle engine. This flame starts out with a temperature of at least 2000 degrees Fahrenheit. The maximum temperatures of the gases in diesel engine cylinders range in the neighborhood of 2700 degrees Fahrenheit, or even higher. If a lubricating oil film were exposed to such temperatures the lubricant would soon be burned away completely no matter how carefully the oil had been refined nor how high its flash point.

The gas temperature decreases as expansion of the burning charge and exhaust takes place. It gradually rises during the compression stroke. The minimum temperature is in the neighborhood of 250 degrees Fahrenheit, while the average during a complete cycle is probably about 950 degrees Fahrenheit.

While experiments made with thermocouples placed close to the inner surface of cylinder walls, as well as in the heads of moving pistons, have revealed the temperatures at these points yet it is practically impossible to obtain the actual temperatures of the surfaces. It is, however, assumed that the cylinder walls have a temperature of only about 30 degrees Fahrenheit above that of the circulating water. So long as the circulating water is not boiling it is safe to assume that the cylinder wall temperature is not above 250 degrees Fahrenheit and the temperature of the piston not many degrees higher. Therefore, with a proper cylinder and piston circulating medium the high temperature of the gases need cause no great concern.

Most oils used for diesel engine cylinder lubrication have a flash point higher than 350 degrees Fahrenheit. Lubricating oil does not burn readily and, furthermore, the time in the cylinder is short. An engine running at only 100 revolutions per minute would expose the lubricated surface of the cylinder to the action of the flame for less than one-quarter of a second. At higher speeds the time allowed for the oil to burn is so short that a flash point of 300 degrees Fahrenheit would probably be sufficiently high for usual operating conditions.

In single-acting diesels the highest cylinder wall temperatures are, of course, at the top and the lowest temperatures at the bottom. In double-acting engines both ends of the cylinder have high temperatures, while the lowest temperatures prevail in the center. The operating factors on which the temperatures depend include the temperature, the velocity, and the quantity of cooling water, the quantity of heat necessary to be conducted per unit of area through the cylinder walls, the diameter of the cylinder, the thickness of the liners, and the load developed by the engine.

Effect of Pressure on Oil Film

With pressures rapidly increasing during the compression stroke, until a maximum of about 500 pounds per square inch is reached in the cylinders of a diesel engine, it is the duty of the oil film to reduce leakage of the compressed gases to a minimum. The gases will tend to escape past the split of each piston ring as well as past the clearance between each ring and its groove. This causes pressure to build up behind the rings. The highest pressure is, naturally, behind the uppermost ring and is nearly as great as that on the piston head itself; it decreases gradually behind each succeeding ring until it is practically negligible behind the lowest ring.

These pressures tend to force the rings, particularly those nearest the top of the piston, against the cylinder wall, producing a sqeezing action. The oil film is, therefore, depended upon to support the pressure of the rings, while at the same time it must effectively seal them against blowby during the compression and power strokes.

Effect of Cylinder Size on Oil Film

With two cylinders of different diameters but equal mean effective pressures, the products of combustion will lose their heat less rapidly in the cylinder having the larger dimension.

Small bore cylinders are more easily lubricated. Although the cylinder wall area increases only as the bore, the amount of heat liberated increases as the square of the diameter and the greatly increased heat effect is probably due to radiant dissipation of heat. This has been shown experimentally to be a very important factor in heat loss from the burning charge to the walls.

Combined with the unavoidably greater thickness of cylinder liners in the larger engine, the temperature difference between the cooling water and the gases in the cylinder will tend to increase. Furthermore, the increased cylinder wall thickness tends to reduce the heat absorbed by the cooling water and, therefore, augments the temperature of the oil film. As the temperature of the oil film is greater with large cylinders than with small ones the former require the use of a somewhat higher viscosity oil for efficient lubrication.

Combined Effect of Temperature and Pressure

The high temperature of combustion in a diesel cylinder occurs simultaneously with the high pressure. Under such conditions the lubricant must be able to spread rapidly on cylinder walls and to replenish its own lubricating film. It must have film strength even when exposed to high combustion temperatures as well as the pressures to which it is subjected through the piston rings, and it must maintain a complete piston seal effectively under all conditions. Cylinder liner wear is generally greatest at the combustion ends of the cylinders where maximum temperatures and pressures exist.

Oxidizing Influences

Regardless of the base of crude oil from which lubricating oils are made or of the refining methods used, oxidation takes place after a certain temperature is reached.

Improper methods for application of lubricating oils to the power cylinder may form undesirable products in the new oil before it reaches the pistons. These undesirable products formed by oxidation increase friction, which results in high cylinder liner and piston ring wear.

The necessary details to be considered in the control of oxidation are the arrangement of the lubricating oil piping, the lubricating oil injection tubes in cylinders, the size of lubricating oil ports in the cylinder liner, and the design of the mechanical lubricator.

Points of Cylinder Oil Delivery

The number of points at which the lubricant should be applied to the piston will depend on the type and size of the engine. Two to four oil holes equidistantly located in the cylinder wall will generally suffice, although this will, of course, depend on the bore of the cylinder. They are usually located between the first two piston rings when the piston is at its lowest point, although in some engines the oil supply points are found above such positions. In the 2-cycle engine, care is taken that none of these oil holes are located in line with the exhaust ports, for otherwise the exhaust gases would tend to carry off a certain amount of lubricant which would be wasted.

It is now more or less standard practice to use a separate pump plunger of the mechanical lubricator for each point of oil introduction. This is desirable to insure positive lubrication at each point. The exact location of the oil feed to the cylinders represents the manufacturer's idea of how lubrication is best accomplished. Some designers have even gone so far as to synchronize the time of lubricating oil delivery with the lowest position of the piston.

Quantity of Cylinder Oil Feed

Few subjects are more frequently discussed in relation to diesel engine operation than the amount of lubricating oil necessary for efficient cylinder lubrication. No general figure can be stated, as this is dependent upon such factors as the type and construction of the engine, grade and quality of the oil, the method of application, the number of oil feeds, and the kind of lubricant employed. While certain figures based on a definite number of drops per minute could be quoted, dependent upon ideal operating conditions, it is still very desirable that a certain amount of experimentation be carried out for practically every oil will vary in its lubricating ability, according to its viscosity and manner of refinement.

Oil engine operators should always be guided by the recommendations of the manufacturers of each type of engine, and by their own close observation of the condition of the engine cylinder walls, so they can gradually reduce the amount of lubricating oil to the most economical degree. Where a mechanical force feed lubricator is used, capable of feeding oil in synchronization with the strokes of the pistons it is frequently possible to control the oil feed so accurately as to approximate the theoretical requirements of the engine for the particular oil in service.

While cylinder lubrication is often carried out separately, with engines of the enclosed crankcase splash-oiled type a certain amount of lubrication will be derived from the vaporous fog of lubricant which is present in the crankcase during operation. Naturally this should justify a certain amount of reduction in the oil feed to the cylinders themselves.

Experience has also shown that lubrication should be positive and uniform; otherwise rings will be worn and may even become stuck, with an appreciable loss in compression. The wristpin, for example, will also be affected. This part on certain engines will be subjected to relatively high temperatures, with but little opportunity for reducing this heat, unless it is cooled mechanically. More attention should be paid to the condition of the oil film than to the quantity.

Using Heavy Fuels

When heavy fuels are burned the rate of lubrication to the cylinders must be increased. While figures regarding the percentage increase above that specified for normal diesel fuels cannot be definitely stated because of the many factors involved yet they can be expected to vary from 10 to 30 per cent. and higher above the regular consumption. Even with satisfactory combustion conditions trouble may arise with contamination of the piston lubricant by unburnt fuel.

Immediate attention should be given to the fuel valve as soon as any indication of dribbling or faulty atomization becomes evident. Where a piston is in a very dirty condition the addition of about 20 per cent. kerosene to the lubricating oil in the mechanical lubricator will assist materially in keeping the piston clean and avoiding piston grunting. Under such conditions the rate of oil fed to the cylinders must be increased to compensate for its reduced lubricating properties.

Over-Lubrication

It cannot be too strongly stressed that excessive lubrication of the cylinders is detrimental in the long run to satisfactory diesel operation. In small high speed engines where cylinders are lubricated by oil thrown from the bearing system, operators have no control over the rate of feed. In such cases baffle plates and scraper rings are depended upon to prevent excessive quantities of the lubricant reaching the walls and over-lubricating them.

Effect of Carbon Deposits

With fuel so regulated as to give a clear exhaust and by using only sufficient oil to lubricate the cylinder, carbon troubles will be reduced to the minimum. An over-lubricated cylinder will always cause trouble from carbon. Such deposits may restrict the area of the exhaust, preventing proper scavenging. This will lower the volumetric efficiency, with the result that cylinder temperatures may rise, lubrication will be impaired, wear will be increased, seizing of the pistons and loss of power may occur and there will, of course, be excessive lubricating oil consumption. Excessive deposits in piston ring grooves are a common cause for improper functioning of the rings. Such deposits result in blowby of the gases, the destruction of the oil film, and excessive wear of both rings and cylinder liners. Deposits collecting on valve seats and spindles are directly responsible for leakage and loss of power.

Importance of Piston Ring Fit

The effective distribution of a lubricant in a diesel engine cylinder will depend to a certain extent on the fit of the piston rings. Loose rings not only decrease the effectiveness of a lubricating oil, but also cause a loss of compression and of power. The loss of compression and passage of hot gases which will result naturally tends to cause overheating of the lower parts of the cylinder and piston, the oil film being either burned or dried up prematurely. Fortunately, however, there is not the same opportunity for dilution of the lubricating oil occurring as exists in the carburetor type of engine, due to the fact that fuel charge is burned to practical completeness as fast as it enters the combustion chamber.

On the other hand, where the rings are too tight a scraping action will be exerted over the cylinder walls, the lubricating film often being broken or at least dangerously reduced. To counteract this possibility certain authorities advise slight beveling of the upper edges of the top piston rings in order to facilitate their sliding over the oil film on the up stroke.

Tight, improperly set rings may also lead to the seizure of pistons, especially where the lubricating film is not perfect, where an excessive amount of oil has been supplied or in case imperfect combustion is occurring. With certain grades of oil an excess of this latter will develop gummy residues due to their lack of free-burning characteristics. While the engine is hot, naturally these residues will be relatively pliable, though in all probability extremely viscous. On shutting down, however, they will often congeal to such an extent as to practically seal or freeze the piston to the cylinder, rendering subsequent starting a difficult proposition. The removal of the pistons from the cylinders is made difficult by such conditions. Upon removal the pistons may have the appearance of solid, cylindrical plugs, owing to the ring's being embedded in what appears to be hard carbon. Attempts to remove the rings by any of the usual means will undoubtedly cause breakage, but if the flame of a small burner is played on the piston a few moments the deposit will soften up and the rings will spring free, permitting easy removal in the usual way.

Safety Work and Operating Profit

By Robert F. Hand

Vice-President and Assistant General Manager, Standard Shipping Company

THE majority of American shipowners are covered by P. & I. Insurance. Some have this insurance on a flat-rate basis and others are entered in mutual P. & I. associations.

In determining the cost of flat-rate protection, it is astonishing how many operators "wink" at safety work, the very thing which, when wholeheartedly carried out, can save them thousands of dollars annually. It is self-evident that if one can reduce his accident frequency rate this year he stands a clear-cut chance of having a reduction effected in his P. & I. premium for the succeeding year. By keeping statistics on his accident frequency and knowing positively that the number of accidents this year proportionately to the total number of employees has decreased, with a coincidental decrease in cost of compensation, medical and hospitalization expenses to his underwrtiers, he will have a convincing argument to submit to them for a lower rate for next year.

Practically the same situation exists for those operators who enter their ships in the mutual clubs, excepting that the reduction in accidents may not reflect as accurately in the lowering of the P. & I. rates in the succeeding year for the reason that there is always the possibility of there being one or more companies in the membership of the mutual club that do not religiously carry out accident prevention campaigns, which deficiency naturally is reflected in the cost to the club.

Not only in the premium rates, however, are the ship operators' pocketbooks affected. Let us examine the deductible franchises. Some P. & I. insurance underwriters of late have increased the deductible franchises for personal injury cases. During the year 1930, in the Standard Shipping Company, the amount remaining uncollectible from the P. & I. club out of the claims submitted for lost-time personal injury expenditures, due to the $50 deductible franchise clause, equalled 17½ per cent. of these expenditures. Adding to this uncollectible percentage other costs such as doctors' fees, expenditures in lost-time cases which amounted to less than $50, plus payments in minor cases where no lost-time was involved, brought the amount borne by the company to 25 per cent. of the total disbursements for personal injuries. The total expense in 37 per cent. of all of our lost-time accidents was assumed by the company.

There are also indirect costs which are both tangible and intangible. Tangible indirect costs include such items as damage to ships' equipment in major accidents which are usually covered by hull insurance, with heavy premium expense and high deductible franchise. The intangible indirect costs are losses not readily measured in dollars and cents, such as lost time of injured seamen on board ship from time of accident to time of pay-off and hospital. This often runs into several days and may run to weeks, and although the wages continue by reason of the Shipping Agreement, these wages are not chargeable to P. & I. insurance.

It is necessary sometimes to divert a ship and land an injured man for immediate hospitalization. The P. & I. club will stand the putting-in expenses, such as extra fuel, provisions, and stores consumed, but will not reimburse the shipowner for the extra wage loss or for the delay to the ship. This delay, which usually results in throwing a ship off schedule, may also result in demurrage of other ships, due to the vessel arriving behind time, and thus delaying docking, discharging, or loading.

The necessity for having some one employed within the company's organization, also, to specialize in the handling of personal injury claims, and the great amount of paper work entailed are sources of further costs.

While all personal injury accidents cannot be eliminated, nevertheless, with a large fleet such as the Standard Shipping Company possesses there is a sharp need for continuous safety education and work; otherwise the accident frequency rate would become so high that the regular office force would be unable to handle all of the claims efficiently. Hence reduction in the number of personal injury accidents tends to hold down office expense, especially when claims arise such as in our company, in practically all of the important ports of the world.

As only a very small percentage of accidents occur in the home port of the company, there is a considerable amount of correspondence involved between the main office and outports. This is true, not only in reference to the injured person, but also in replacing him; and, of course, the expense incurred in connection with this replacement is charged to the operating account and not to the P. & I. club.

Tied up with the accident frequency rate is the severity rate. Quite naturally, the longer a man's period of disability, the greater may be the cost of the settlement which he may secure. First-aid treatment administered as soon as possible after the accident will cut down the period of disability and probably result in a substantial reduction in the total cost of the case.

Other points bearing on costs with respect to personal injury accidents include the presence on board ship of an adequate medicine chest, periodic inspection to see that this chest is well supplied and to make certain that the officer in charge of this chest and of rendering first-aid treatment familiarizes himself, before an accident occurs, with the knowledge necessary to dispense the remedies intelligently. This officer should also be instructed to render his treatment immediately upon learning of an accident and to promptly submit an official report to the management.

In conclusion, therefore, let me say simply this: "Lower your accident frequency and severity rates, and the saving attained will reduce your cost of operation."

Navigation on the Columbia River

Part III. Decline of River Navigation on the Upper Columbia and the Beginnings of Modern Development for Efficient Canalization

By Charles F. A. Mann

WITH the coming of the Union Pacific in 1882 and later the Seattle, Portland and Spokane Railroad, or the North Bank Line, great bridges were thrown across the Columbia at many points. Some of the most magnificent structures in America now span the mighty Columbia at a dozen strategic points. Highways in later years brought many small connecting links across the Columbia, both state and privately operated. It was not until 1916, however, that the State of Oregon was connected with an east-west highway through the Columbia Gorge, above the railroad on the south bank, that drove away the river boats. It will not be until 1931 that the state of Washington finishes its new Evergreen Highway on the north bank above the other railroad.

Bird's-eye view of the Cascade Rapids on the Columbia River with the Bridge of the Gods in the background and Cascade Locks and Canal at the left.

Meanwhile time has brought still a third method of transportation that uses the Columbia River Gorge through the Cascade Mountains. That is the airplane, which finds steady winds and a lighted pair of banks above a broad river to lead them from the Coast to Pasco. The never failing and often strong west wind that blows through the gorge aids airplanes today just as it did the first navigator of the upper river when he ran a light-draft schooner with a leg-of-mutton sail up to the mouth of the Snake.

Throughout all this period of expansion and change, the coming of highways and railroads, and even airplanes, the produce of the Columbia Basin grew by leaps and bounds and commerce increased rapidly. Portland grew, and its pioneer capitalists invested their fortunes in banks, land, and industries and built a rich city on the Willamette.

Citizens of Portland interested in river transportation began advocating improvements and brought pressure on their state government and on Congress as early as 1870. In 1878 the first surveys of the Columbia River were made below Portland; and a program was at once laid before Congress for the deepening of the lower Columbia Channel and the construction of jetties at the wide mouth of the river at Astoria to make it scour a deeper channel through its own bar. This work began in 1884 and was finished a quarter of a century later at a cost of $16,000,000. There are two jetties; the South Jetty, seven miles long, and the North Jetty, two and a half miles long. The hydraulic nozzle formed by these jetties has effectively deepened the channel to a maximum of 46 feet at low water. Work on the Columbia River jetties was in charge of G. B. Hegardt, then with the U. S. Army Engineers and at the present time General Manager and Chief Engineer of the Port of Oakland.

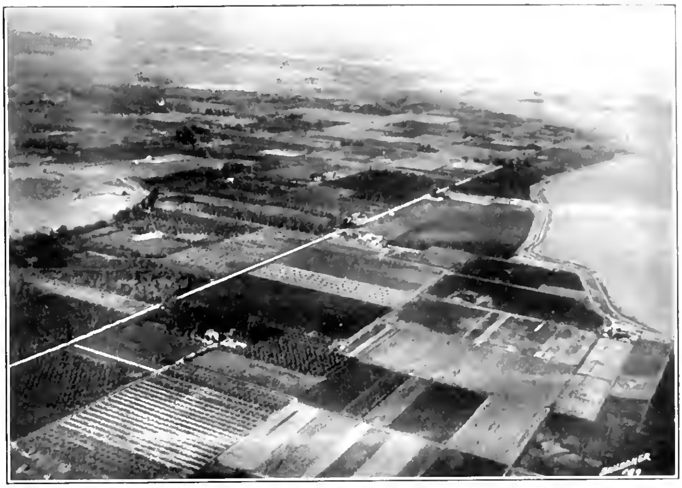
In 1878, work by the U. S. Army Engineers toward surveying and establishing a channel in the Columbia between Portland and Astoria had been started, with a program of constructing contraction jetties in the river and checking carefully the annual deposit of silt at about 70 points in the river bed. This work has been going on for half a century and a 35-foot channel has now been practically stabilized, after a total expenditure for new construction of about $11,000,000 and another like amount for maintenance.

In 1891 the famous Port of Portland Commission was organized and began hammering away with a fleet of dredges on the shallow Willamette River to make a deep harbor for Portland, straightening the crooked channel and filling in great areas of muddy river flats. This commission has expended about $15,000,000 on this work since its organization, besides aiding the Army Engineers each year, after the June flood in the Columbia recedes, with the dredges for use in removing the fresh silt deposits in the river, amounting to about 5,000,000 cubic yards each season.

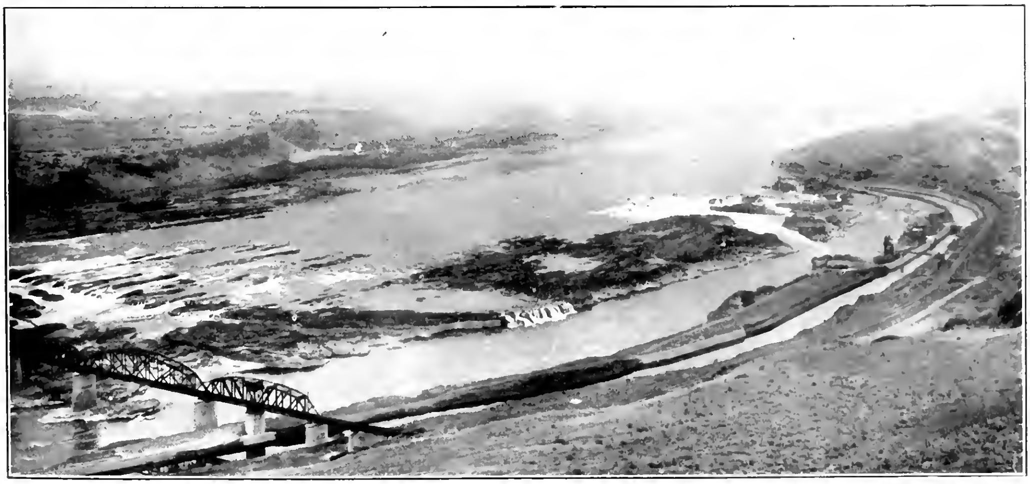
Harbor and hydraulic experts the world over have recognized the achievements of the engineers in charge; and the names of Colonel G. R. Lukesh of the U. S. Army

(Please turn to Page 130)

Scenes on the Upper Columbia



Above: Aerial view of irrigated farms at Pasco, Oregon, at the junction of the Columbia and the Snake Rivers. At left: Famous Columbia River excursion steamer Bailey Gatzert entering Cascade Locks on their official opening, 1913. Below: Aerial view of the Celilo Rapids showing locks and canal and Union Pacific Railroad Bridge.



Some Observations on Safety in Salvage Operations

With Interesting Examples from Practical Experience Showing the Risks Involved from Fire, Gas, Cables, and "Bends"

By Captain W. N. Davis,
Merritt-Chapman & Scott Corporation

IN THE salvage of distressed vessels there are, of course, many hazards to be encountered: and if some salvage cases are to be brought to a successful conclusion, the personnel must accept considerable risks. As in all other hazardous occupations, however, a knowledge of the dangers to be met is one of the most effective safeguards against them.

It must be recognized that there are many locations where, for weeks at a time, more or less danger is involved in every trip to or from a stranded vessel. The proper kind of boats and, above all, experience and care can lessen the danger; nothing can do away with it entirely.

In the old days of wooden ships, terrible risks often were necessary to take the crew off a stranded vessel or for the salvage crew to get away with bad weather coming on and the ship in imminent danger of breaking up. But today, with strong steel ships of large size, the ship is very often safer than the best of lifeboats and one is wiser to remain aboard than to risk life in getting off in a small boat.

I recall many instances where lives were lost in the attempt to get off a stranded vessel, when later events proved that the vessel itself would have been an entirely safe refuge. It was about thirty years ago when the British steamer Ariosto stranded on the coast of North Carolina, near Hatteras Inlet. There was a heavy swell prevailing at the time and the ship was swung broadside on the outer bar that parallels the beach at a distance of several hundred feet. The steamer was loaded with a full cargo of wheat and cotton and, as she rolled and pounded, beating up on the bar, she commenced to leak badly and soon the water in the engine room was rising fast. It was decided to leave her. Rockets were sent up for assistance.

The night was so dark and cloudy that the beach could not be seen. The captain thought they were on the dreaded Hatteras Shoals and the order was given to launch the lifeboats on the lee side. The two boats were lowered and the entire crew, with the exception of the captain, the chief engineer, and the third officer, got into them. Just then a Coast Guard patrol discovered the ship and, standing on the beach abreast of her, burned his red flare to show the ship that he had seen her. The captain, realizing that help was near, advised the men to come back on board and a few of them did so from the second mate's boat, which was leaking badly. But the sight of that red flare burning on the beach was too much for the others, and, with a cheer, the boats started for the beach. No sooner were the boats away from the shelter of the ship than they both capsized and not a man reached the beach alive. Thirty-one lives were lost. This happened on Christmas Eve and, from the following day until the end of March, a salvage crew lived on the ship, in safety if not in comfort. The cargo of cotton was saved, the wheat thrown overboard, the ship was pumped and patched, and had it not been for bad luck with the weather, the ship herself would have been saved.

In 1917, a Coast Guard cutter lowered a lifeboat to endeavor to take the crew off the stranded tanker Louisiana, ashore near Ocean City, Maryland. The first boat capsized, and a second boat sent to the rescue shared the same fate, with the loss of both boats' crews. The shipwrecked crew of the Louisiana remained on board until the weather improved, and a few days later the ship was floated by salvage forces.

On the other hand, when a ship is on one of the outlying shoals, has water in her, and the weather threatens, it is good practice to go while the going is good. There have been numerous instances where nothing but the masts of large steamers have been left showing above water after a heavy storm. To sum up, when a breeches buoy can be rigged to the shore, it is good practice to rig it; but when one cannot have this "line of retreat" to fall back on, experience and judgment must decide the best course.

Fire Hazards

The hazard of fire on shipboard is universally feared and when a ship strands or partially sinks, with the consequent relaxing of discipline, this danger becomes even more serious; especially is the hazard multiplied many fold should the vessel happen to be an oil burner, and, maybe, has leaky tanktops or margin plates which permit the fire room bilges to fill with oil. When a stoke-hold fills with water under these conditions and later is pumped out, a heavy coating of oil covers everything, so that, when fires are started in the furnaces and things get warmed up, a flareback is apt to start a blaze. This, however, appears to be rather an unavoidable risk as, in many cases, it is absolutely necessary to have fire on a wrecked ship's boilers if she is to be saved; about the only thing that can be done, therefore, is to keep fire extinguishers handy.

Before the day of the oxy-acetylene torch, it was a mighty tough job to cut through bulkheads or decks to install pumps; today, this work is done in a mere fraction of the time formerly required, though a prudent salvage officer will have hose rigged and chemical fire extinguishers ready if there is anything near that can take fire.

It is often necessary or desirable to cut holes for drainage from one compartment to another, particularly when holds are blocked by cargo that will take a long time to handle. For example, one sometimes can remove cargo down to the top of the shaft tunnel, cut through the tunnel top, enter the tunnel and cut drain holes through its side into each hold through which the tunnel passes. By using this method and putting suctions into the tunnel, the whole after end of the ship can be pumped; this, of course, refers to vessels having the engines amidships.

But it is obviously impracticable to use an oxy-acetylene torch where everything is covered with fuel oil, so we have worked out a method of our own for doing such work safely. We make such drainage openings while the place to be cut is under water, using a diver and the underwater cutting torch. It is a wise precaution, of course, when cutting a hole down through the top of a tunnel, where explosive gases might possibly be trapped, to drill a small vent hole before attempting use of the underwater cutting torch, using for that purpose a ratchet or air drill. And sometimes, before pumping, it is necessary, for stability's sake, to cut holes through between-decks to allow water to drain to lower holds and thus prevent listing or capsizing when the ship is being pumped. In such cases, where there is danger of the unburned gases from the torch being trapped, the oxy-electric underwater cutting torch, rather than the oxy-acetylene, must be used if we are to avoid the danger of an explosion which probably would kill the diver using the torch, if it did no other damage.

Gas Hazards

Perhaps the greatest danger to the ship salver, and certainly the most insidious one, is that created by gases generated by petroleum or by decaying vegetable matter. There is an acute hazard of this kind in vessels where holds are supplied with fresh air by wind sails, as gas may accumulate very quickly should the wind die out; this danger is present also if only the ship's ventilators are being depended upon for the fresh air supply.

Some years ago the steamship Boston City was raised, after lying on the bottom of New York Bay for several months. The holds were being cleaned out, preparing the ship for drydock, and rotten grain was being discharged into scows. The wind died out during the noon hour, and when the men returned to the hold, they were immediately overcome. Captain Sharp, the salvage officer, and his son gave their lives in a brave but ill-considered attempt to rescue the men who already were down. In a few minutes, a man protected by a diver's helmet went down and sent up the bodies. Captain Sharp, who was a very powerful man, with tremendous chest development, still breathed; in spite of the best medical assistance, however, he died of pneumonia within a few days. This accident might have been avoided by keeping lighted lanterns in the bottom of the hold, where the men were working; this, in fact, had been done at the start of the job but nothing had happened and everyone became careless. Today, when we discharge wet grain, we often take it out with a suction, using a second pump to carry the necessary water into the hold. The work below is done by divers or by men in wading dress, who wear hose masks.

So many vessels nowadays are oil burners that we are constantly on the alert for explosive gases. There naturally will be a lot of fuel oil floating around when tanks are leaky, and in hot weather petroleum gas sometimes is generated in such quantities that ordinary lanterns cannot be used for detection purposes because of the explosive risk. Our salvage vessels, therefore, are now all equipped with miner's safety lamps to avoid this hazard. The manner in which the safety lamp burns will show the presence of explosive gases and, if there is not enough oxygen present to support human life, the lamp will go out.

Gas from grains or coffee is very irritating to the mucous membranes. The first symptom is a feeling as of a bit of sand in the eye; this is followed by conjunctivitis and, in a few hours, by photophobia and the men are incapacitated for several days. The best preventive, and also the best cure that I know, is a 10 per cent. solution of argyrol dropped in the eye morning and night. I have used gallons of boracic acid solution on such cases but, while it helps, it is not nearly as effective as the argyrol.

Of course, one will be on the lookout for gas when there is decaying grain in a ship's hold, but it is sometimes very difficult to detect and it manifests itself in strange ways. I was present on a ship some years ago when a man was gassed while lowering a suction into a hold filled with partly melted sugar and water. He fell into the hold as if something had struck him and floated there on his back. He was dead when taken from the water a few minutes afterward, though no water was found to have entered his lungs. The weather at the time was extremely hot and dead calm.

The steamship Steel Inventor was ashore in the Caribbean; dry cargo had been discharged from one of her holds and it was empty. The adjoining hold, loaded with steel and cotton, was flooded to sea level and the ship's pumps could not pump it. To free the flooded hold of water, salvage pumps were installed in the empty one and rivets were cut out of the bulkhead, near the bottom, so that water would flow from the flooded hold to the empty one. Three men did this preliminary work. The rivets were burned by oxy-acetylene torch, then punched out, wooden plugs were inserted until a sufficient number of rivets had been removed. The salvage officer visited the hold and found that the men had completed the rivet removal and were beginning to pull out the plugs. An inspection an hour later showed several feet of water in the hold, but the men were nowhere to be seen. After a fruitless search for them all over the ship the pumps were started, the water was pumped out and there on the bottom were the three bodies where they had fallen, quickly overcome, it appeared, by gas. Thorough investigation of the case and consultation with the United States Bureau of Mines established the fact that the water in the flooded hold had been charged with gas by decomposition of the cotton. The water rushing through the rivet holes released this gas which quickly took the place of the air in the lower part of the empty hold.

Contrary to usual belief, the gas generated by grain and other decaying vegetable matter is an irritant gas, not a poison. It is deadly, however, in the sense that it is an inert gas which displaces the air. One full breath of this gas, without any oxygen, will cause a man to lose consciousness, and unless he be moved to a place where he can get oxygen death will ensue in a little while. This danger can be guarded against by carefully watching safety lamps, which should be kept constantly burning in the bottom of the hold, and getting the men out immediately if the lamps should cease to burn.

As most of the machinery used in modern salvage work is gasoline-driven, steps must be taken to prevent the accumulation of carbon monoxide gas below decks by carrying the motor exhaust well up into the air. Gasoline vapors, also, must be guarded against. Amateur salvors had been carrying on protracted operations on a steel sailing ship; their pumps, driven by old automobile engines, had been running intermittently for some weeks in the between-decks of the ship. After salvage operations had been completed and repairs were being made, a man was sent into the fresh water tank to clean it out. He carried a candle and an explosion followed which ripped the tank to shreds and caused considerable other damage; and, of course, the man was killed.

Other Hazards

It was the custom in the old days, when salvage operations were started on sailing ships, to send down topgallant and royal yards and topgallant masts and, sometimes, topsail yards and topmasts as well. The object of this was twofold: to give the ship greater stability and so that the yards and mast could not come down on the heads of the salvage crew when the ship pounded on the bottom. Now there are no sailing ships, but the danger from falling gear still exists, though to a very modified degree. It is necessary to watch funnel guys and stays and shrouds of the masts and slack them up, if necessary, to prevent them from parting.

The hazard encountered by men working around cables and holding turns is universally recognized, but proper precautions are often neglected and, sometimes, with very serious results. Men so engaged should never be permitted to stand where they will be injured by the carrying away of a rope or block. And they should **never** be permitted to stand in the bight of a rope. The momentum acquired by a hundred pound snatch block in flight is little short of devastating, and the blow from such an object literally crushes a human body when it strikes. Despite the great experience and extreme care instinctively exercised by our men, we ourselves have not wholly avoided such accidents; one man lost his leg at the hip from the blow of a snatch block; another lost an arm when a cable parted. This parting-rope hazard has to be watched with extreme care under certain conditions. For example, when a stranded ship is being hove off by cables, extremely heavy purchases are used and breaking strains may easily result when a ship is swung around by the surge of the sea or by heavy tides. These salvage cables are 15 inches in circumference so that, should they let go, the men must be out of the way.

When a ship is straining heavily and the bottom is being pushed up under the boilers, there is danger from bursting steam pipes. When steam must be kept on the boilers to save the ship, this danger has to be faced. When portable boilers are placed on a wreck by salvage men, no precaution is too great to make them secure, as there is nothing more disconcerting than a boiler with a full head of steam and a heavy fire when it breaks its connections and starts sliding around the deck of a pounding ship.

Diver Hazards

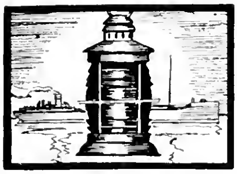
Divers are first on the ground, the "eyes of the salvage officer," and must face conditions "in the raw." Among the many risks the diver runs, perhaps the one he dreads most is that of "getting foul." This can occur in innumerable ways but it happens much more easily when diving on a wreck than when on construction work. Sometimes the current or the undertow will carry a diver into a position from which he finds it extremely difficult to extricate himself. I have in mind cases where divers have crawled through openings barely large enough to squeeze through and where it took skill and determination to get out again; and other cases where, in order to get clear, a diver has had to cut his air hose, or his lifeline, or even both. There used to be a saying: "There is a sweet little Cherub that sits up aloft and takes care of the life of poor Jack," and I think that the divers also must have their "Sweet Little Cherub" when recalling how many have been the narrow escapes and how few the fatalities.

One of the most dangerous of the diver's jobs is that of breaking out cargo on a completely sunken ship. In such a ship, sometimes, when breaking out such cargo as cotton bales, the whole cargo floats as soon as a tier is broken, thus jamming the diver up against the deck or fouling his hose and lifeline. There is a like danger, too, when breaking out cargo in the far corner of a hold for the cargo whip may cut off the diver's hose. Some divers, when doing this work, make it a rule to work the whip on the same side of the stanchions or pillars as the hose and lifeline so that, in case these are fouled by the whip, the diver will be dragged out of the hold instead of having his hose and lifeline parted.

It must be remembered that submarine lights are useless in the murky waters of most of our harbors or even in the holds of ships when a diver stirs up the water; he must work entirely by feeling his way around. The high degree to which the best divers have developed these senses of feeling and of direction is marvelous as is their skill in taking measurements. But the diver cannot see some piece of wreckage or cargo which may be poised above his head, ready to fall on him and foul or crush him.

Divers are hardy men and usually in good physical condition but, occasionally, temporary illnesses lead them into trouble. A diver should never go down when feeling nauseated as, should he become violently ill, there is danger of choking to death. A fine young man, who was a skillful diver, lost his life in this way not so long ago, and I am convinced that other unexplained deaths of divers have had a similar cause. And now we come to the dreaded "Bends," or compressed air sickness, of which we have all heard and read so much. This disease has been the subject of exhaustive investigation by the United States Navy and the United States Bureau of Mines, and we are indebted to them for much of our organized knowledge of the subject. It is an ever-present danger when men are diving in water more than 50 feet deep. Some men are more susceptible to it than are others and these men should not attempt to dive in deep water. Even those who seem to be almost immune to the bends should decompress in accordance with the official scientific "Tables."

(Paper read before the Nineteenth Annual Safety Congress, at Pittsburgh, October 1, 1930.)



Marine Equipment

FIRE ALARM SYSTEM — DIESEL TRAWLER
GENERATING SETS — SEAM COMPOUND

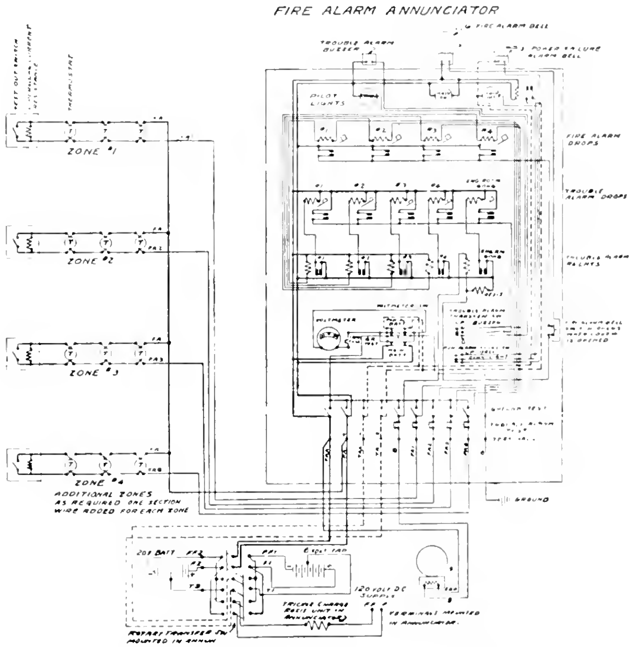
A New Marine Fire Alarm System

By Charles J. Henschel, President

Charles J. Henschel & Co., Incorporated

FOR over twenty years, the United States Navy Department has used exclusively a fire alarm system, the heart of which is an especially constructed thermometer so designed by the insertion of wires extending into the mercury column that when a certain temperature has been reached these wires would be short circuited, thereby closing the necessary circuits to function or to operate the alarm system. This system was adopted by the Navy after tests had been made on every conceivable device that would indicate a rise in temperature. This is considered to be one of the most important systems on naval vessels, for a failure to detect an overheated condition, not necessarily a fire, might result in an explosion and consequent destruction of the vessel.

With these facts before us some three years ago, we put our engineers to work to develop a fire alarm system, the important element of which would be a mercurical thermostat designed to meet all the requirements of the Navy specifications. It was important that circuit arrangement be of a simplified type so that no expert service would be required to maintain the system in an operating condition, thereby reducing the maintenance cost to the ship operator. The result of these experiments is the Henschel electrically supervised automatic marine fire alarm system, which has been tested by the Bureau of Standards and approved by the Steamboat Inspection Service of the Department of Commerce as meeting all requirements.



Diagrammatic arrangement and wiring of the new Henschel fire alarm system.

Referring to the wiring diagram, it will be noted that the circuit comprises a common wire throughout the fire zone area with each fire zone having its own circuit or section wire. The thermostat units are connected in parallel between the common wire and the zone wire, and the unit is so arranged that the removal of any unit or accident breakage or derangement of the circuit automatically indicates an open wire condition resulting in a troubled alarm signal at the fire system indicator; and an excessive temperature rise causes a short circuit of the common wire and zone circuit wire, which results in a fire alarm signal at the fire system indicatoı, also setting in operation the fire alarm gongs.

An automatic electrically supervised fire alarm system cannot be operated without the use of relays. In this system we have reduced the number of relays required approximately 50 per cent., simplifying the system to that extent.

The United States Steamboat Inspection rules allow the use of dry batteries for the power failure circuit; should these batteries fail, the entire system becomes inoperative. This was not considered good practice, and an ingenious method of battery control was devised as follows:

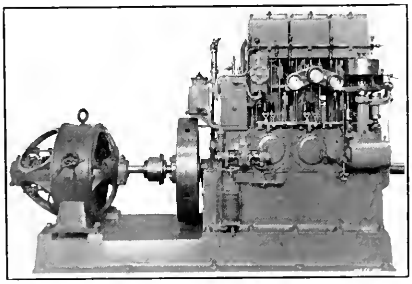
Two 20-volt storage batteries are provided, each of which has a 6-volt tap. The fire alarm system is operated by the 20-volt circuit, the power off alarm is operated by the 6-volt circuit. The two storage batteries are connected to the system through a multipole Navy standard rotary switch in such a manner that when No. 1 battery is supplying energy for the system, No. 2 battery is on charge and at the same time the 6-volt tap of battery on charge is supplying energy to the power off alarm circuit; when the switch is thrown to No. 2 position the conditions are reversed, and this makes it possible to always maintain the batteries at their proper voltage and provide a constant source of energy for the entire system.

A voltmeter and switch arrangement are provided, so that voltage readings of the batteries can be made, and also so that ground and leakage tests on all circuit wire can be accomplished.

All the material used is of the best, and of Navy Standard type and design, particularly fitting for marine applications. The system is fully covered by patent applications.

Economical Diesel Generating Sets for Auxiliary and Emergency Power

THE twin-screw, tunnel-stern river towboat Herbert Hoover now nearing completion at the yard of the Dubuque Boat & Boiler Works, Dubuque, Iowa, for the United States Army Engineers will be the largest and most powerful craft of her kind in the world. The hull is 215 feet long by 42 feet beam and will be propelled by two McIntosh & Seymour diesel engines developing a total of 2600 horsepower.

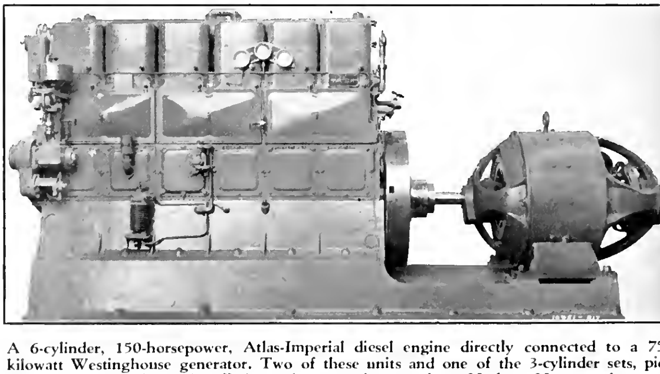


The 3-cylinder, 45-horsepower, 30-kilowatt Atlas-Imperial diesel engine—Westinghouse generator electric light and power set which is becoming very popular as an emergency unit in American merchant vessels.

Lighting and auxiliary power requirements will be taken care of by an installation of three Atlas Imperial-Westinghouse diesel generating sets. Two of these are 6-cylinder, 8-inch bore, and 9½-inch stroke diesels developing 150 horsepower at 500 revolutions a minute and each direct-connected to a 75-kilowatt Westinghouse generator. The other set is a 3-cylinder, 6½-inch bore, 8½-inch stroke diesel developing 45 horsepower at 600 revolutions a minute and direct-connected to a 30-kilowatt Westinghouse generator.

These sets have no difficulty in meeting the stringent specifications as to economy of fuel and speed regulation for the steady voltage required for lighting and for electrically operated appliances.

Atlas Imperial generating sets are very popular with ship operators. The new Matson passenger liners are each to have a 3-cylinder, 45-horsepower, 30-kilowatt set for emergency lighting use. The Gulf Refining Company has purchased six of the 60-horsepower, 45-kilowatt size for auxiliary use on its new diesel tankers. These units are built to meet fully the requirements of the American Bureau of Shipping and of the Steamboat Inspection Service for auxiliary and emergency electric generating sets for the American merchant marine service.



A 6-cylinder, 150-horsepower, Atlas-Imperial diesel engine directly connected to a 75-kilowatt Westinghouse generator. Two of these units and one of the 3-cylinder sets, pictured above, are being installed on the new river towboat Herbert Hoover, the most powerful craft of her type in the world.

A Remarkable Tanker Record

THE eight tankers of the Associated Oil Company's fleet during 1929 transported 22,000,000 barrels of refined, crude, and fuel oils in a total of 355 voyages to points which included the west coast of South America, New York, Philadelphia, Honolulu, and Pacific Coast ports, according to a recent report made by H. T. Earl, manager of transportation for the company.

Three of the vessels with a total capacity of 186,000 barrels were gasoline carriers. The remaining five, with a total capacity of 381,000 barrels, transported crude and fuel oils; the total capacity of the eight ships being 567,000 barrels.

During the year none of these vessels sustained any accidents of a serious nature, the Associated Oil Company marine department coming up from third place in 1928 to second place in 1929 in the safety contest of the National Safety Council.

Lubricating the U. S. Navy

THE same quality of Cycol motor oil that is familiar to hundreds of thousands of western motorists is providing lubrication protection to equipment of twelve departments of the United States government, including the Pacific fleet of the Navy, under the Associated Oil Company's million-gallon contract for 1931, recently awarded on the basis of lowest service cost.

This Navy contract, according to P. E. Allan, domestic sales manager for Associated, covers not only the supplying of Cycol for the lubrication of machinery and motors aboard battleships, submarines, aircraft, and other naval vessels, but also the filling of all lubrication needs of the Forestry Service, the Coast Guard, the Lighthouse Service, the Departments of Interior and Agriculture, the Indian Irrigation Service, the Bureau of Reclamation, the U. S. Army, the Bureau of Public Roads, the Custom House, the U. S. Marine Service, and a number of other government departments which take advantage of the Navy's careful method of purchasing lubrication on a service cost basis.

"Under the Navy contract, Cycol is supplied to fill every lubrication need for which a motor oil is desirable, including use in such machinery as automobiles, diesel engines, and main motors in submarines, turbines, motor boats, trucks, tractors, launches, air compressors, high compression gasoline engines, patrol boats, airplanes, and motorcycles," Allan explained.

"The story of Cycol and its superior qualities, its famous Edeleanu treatment, and its unequalled stability has been told many times, but nowhere is found such convincing proof as in its selection by the Navy on the basis of service cost tests, in which it successfully competed with most of the best known and highest priced oils on the market. In these tests its outstanding stability under the most difficult conditions of high temperatures, heavy bearing pressures, and high speed were definitely proved."

Marine Trade Notes

NEW LINES FOR PROMINENT MARINE DISTRIBUTORS

Alexander McNab has appointed the Lalor Electric and Engineering Co., Ltd., as his distributor for Northern California, Oregon, and Washington. Among the appliances manufactured by Alexander McNab are:

Concentration Indicator— giving a continuous reading of the condition of water contained in hollow feed lines, evaporators, condensers, boilers, or feed tanks.

Vista System of shaft lubrication;

Propeller shaft clearance indicator, a simple and convenient inboard method for determining, to a fine degree, the actual wear of the propeller shaft liner and stern tube bush;

Dial-O-Meter, for indicating the weight, height, and volume of liquids;

Direction indicators— indicating on the navigating bridge every movement of the propelling engines in the ahead and astern directions and speed of propeller shaft.

Direction and revolutions indicators, same as above and also giving a record of the total revolutions made by the propeller shaft in the ahead direction;

Pneumatic revolution counters for engine room or bridge installation. No mechanical moving parts between propelling unit and counter location;


J. M. Lalor, president, Lalor Electric & Engineering Company.

Mechanical engine counters, a better type instrument for engine room installation;

Logometers—Simplex, for single screw installation, with indicator in front of the maneuvering valve of turbine or diesel units; records total amount of revolutions and indicates the revolutions per minute and direction of turning of shaft; and Duplex type, for twin screw installation, enabling the engineer to synchronize the speed of port and starboard propelling units.

Electric boiler salinometers (concentration indicators) indicating by visual and audible means the entrance of the least grain of salt into feed water or other lines; it also shows the amount of salt contained in feed water before it enters the boiler;

Maximum and minimum alarm indicators, announcing by visual and audible means the high and low pressure points or high and low temperature points in any system under control;

Frigidometers, for installation at the navigation position, indicating by a loud alarm and visual means the proximity of ice bergs at sea;

Automatic and At-Will electric whistle controls;

Self-Draining Whistle Valves, for hand lanyard operation, prevents freezing of condensate, always assures a dry, clear, crisp blast;

Cascade boiler circulators and fuel economizers, equalizes temperatures, prevents pitting and corrosion and scale formation, and reduces fuel consumption in Scotch marine boilers;

Propeller shaft lubricating system, prevents the entry of sand, grit, and water to the stern tube, the tail shaft runs in a bath of lubricant;

Catalogs of any of these devices may be obtained through the Lalor Electric and Engineering Co., Ltd., San Francisco, California.

New Radio Compass.—The Airplane Marine Direction Finder Corp., of Lindenhurst, Long Island, New York, manufacturer of the Kaess Radio Compass, has appointed the Lalor Electric & Engineering Co., Ltd., of San Francisco, its Pacific Coast representative. This company will shortly have available for distribution a catalog describing the four models manufactured; namely, Model C for passenger and freight ships; Model D, for smaller freight ships, sea-going tugs, and similar craft; Model E, similar to above, with Sperry gyro-repeater. There is also in course of construction a Kaess radio compass for yachts. One of the exclusive and novel features of the Kaess radio compass is said to be the visible indicator which is used in the instrument in addition to the audible finder.

Sales Representative Appointed.—The Diamond Power Specialty Corporation has announced the appointment of The Arthur E. Jones Company, Syracuse, New York, as sales representative for Diamond soot blowers and Diamond water gauge glasses and water columns in the Syracuse district.

Cory Equipment for Navy.—The U. S. Navy Department has recently authorized orders approximating $150,000 for naval equipment to be manufactured by the Bendix Aviation Corporation, Charles Cory Corporation Division.

One order covers engine order telegraphs, rudder angle indicators, fireroom telegraphs, and other communication apparatus, all to be built on new design prepared for exclusive naval use on the four 10,000-ton cruisers now building in the Brooklyn, Philadelphia, Mare Island, and Bremerton navy yards.

Another order received by the manufacturer covers the interior communication, electrical equipment, and rudder angle indicators for seven 165-foot Coast Guard patrol boats now building at the Bath Iron Works.

The Chas. Cory Corporation is represented in San Francisco by the Toumey Electric and Engineering Company.

Distributor Appointed.—W. & J. Tiebout, New York City, has been appointed jobber and distributor to handle the marine output of the Pioneer Instrument Company of Brooklyn, division of the Bendix Aviation Corporation. Tiebout will cover the Atlantic Coast territory, handling, in addition to Pioneer, the Consolidated marine products. The Consolidated Instrument Company was recently merged with Pioneer.

New Marine Manager. Fairbanks, Morse & Company announces the appointment of L. B. Jackson as manager of the Marine Diesel Engine Sales with headquarters in Chicago. Mr. Jackson's experience, after having been graduated with an M. E. degree from Stevens Institute with the class of 1910, has included various phases of marine work. For twelve years he was actively engaged in the marine field which included two years of deep-sea experience, five years as plant engineer of the Texas Company's shipyard, and five years as Superintendent of the Technical Division supervising maintenance and repairs. From this work he came to the Beloit factory of Fairbanks, Morse & Company in 1925 where he has acted in the capacity of chief engineer for the past five years.

L. B. Jackson, manager Marine Diesel Sales, Fairbanks, Morse & Co.

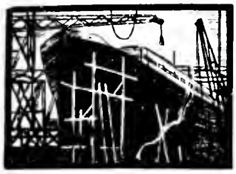
P-P Line to Establish New Pacific Coast Department.—Announcement was made February 5 by L. E. Archer, Pacific Coast manager of the International Mercantile Marine Company, that in view of the development of the Panama Pacific Line in the intercoastal passenger and freight business, steps are being taken for the line to establish its own operating and freight departments on the Pacific Coast. An agency agreement under which the Pacific Steamship Company has handled those departments will be terminated at a mutually satisfactory date. G. F. Ravenal, who has been manager for the International Mercantile Marine Company at Boston for a number of years, is in San Francisco to confer with Mr. Archer on measures to be adopted for carrying out the proposed changes.

New Marine Department Head.—Crane Packing Company has announced that Harry W. Parsons has assumed the management of its Marine Department, with headquarters in the company's new offices at 75 West Street, New York City.

Promotion Announced.—Word has been received from D. W. Niven, manager of the Federal and Marine Department of the General Electric Company at Schenectady, that W. A. Thorpe has been appointed assistant to the manager of this department.

European Ship-owners Installing Exhaust Turbines.—The Messageries Maritimes have recently placed an order for the conversion of five vessels, ranging in total output from 3500 to 4000-indicated horsepower each; and the Compagnie Generale Transatlantique is to install this type of machinery, to develop altogether 7000 indicated horsepower, in a new vessel, the steamship San Pedro, now under construction at Harland & Wolff's, Belfast. Similarly, three vessels of the Federal Steam Navigation Company, London, are being fitted with exhaust turbines by Swan, Hunter & Wigham Richardson, of Newcastle-on-Tyne.

Grace Lines Consolidate.— Merger has recently been effected of four steamship lines all owned by W. R. Grace & Co. coincident with the signing of the contract with the United States Shipping Board providing for a loan to enable construction of the four passenger and freight liners by the Federal Shipbuilding & Drydock Company at a total cost of $17,000,000. The lines affected are the Grace Line, operating from New York to Colombia, Ecuador, Peru, and Chile by way of the Panama Canal; the Grace Line, northern division, from Seattle and San Francisco to Peru and Chile; the Panama Mail Line from New York to San Francisco by way of Colombia and the west Coast of Central America; and the New Orleans and South American Steamship Co., operating from New Orleans to the west coast of South America.



American Shipbuilding

Edited by H. C. McKinnon

Alaska Supply Ship to be Built.—The United States Bureau of Education Division for Alaska (Department of the Interior) is planning the construction of a new supply ship to replace the famous schooner Boxer. An appropriation for the building of the vessel, not to exceed $400,000, was made in the first deficiency bill signed by the President February 7. The vessel will be built under the supervision of the Department of the Interior at Seattle, for which J. R. Ummel is purchasing agent and office manager.

While the architect had not been appointed up to the time of going to press, it is expected that plans will be ready for the shipyard's sometime in April. The vessel is to have the following approximate dimensions: Length, 217 ft.; beam. 40 ft.; depth, 14 ft. 6 in.; sheathed wooden hull; 1500 horsepower diesel engines developing speed of 14 knots; accommodations for 30 passengers and refrigerator cargo space for 2000 reindeer carcasses.

Bids Opened on Ferryboat.—Bids were opened February 10 by Lambie & Mabry, naval architects, with offices in the Security First National Bank Building, Wilmington, Calif., for the construction of a steel hull, diesel-electric ferryboat for the Coronado Ferry Company of Coronado, Calif. The bids were as follows:

- Lake Washington Shipyards, Seattle, $199,635 and 6 months;
- The Moore Dry Dock Co., Oakland, $203,000 and 6-1/3 months;
- Los Angeles Shipbuilding & Drydock Corp., $212,000 and 7 months.
- General Engineering & Drydock Company, Oakland, $214,000 and 7 months.
- Bethlehem Shipbuilding Corp., Ltd., San Pedro Works, $225,350 and 5 months;
- Craig Shipbuilding Co., Long Beach, $247,000 and 7 months.

The above figures are exclusive of the cost of the machinery, contract for which has already been awarded to the New London Ship & Engine Company contingent on building the hull.

The ferryboat is to be 210 ft. long, 65 ft. beam, 9 ft. draft. Power plant will consist of four 375-horsepower Nelseco diesel engines, direct connected to four 260-kilowatt Westinghouse generators and four 30-kilowatt exciters. These will supply energy for two 1200-horsepower electric propelling motors connected to a propeller at each end of the vessel, and giving a speed to the vessel of 13.25 knots.

The ferryboat will have capacity for 60 automobiles, with a 4-lane driveway at each end.

Another Ferryboat Planned.—The Astoria-North Beach Ferry Company of Astoria, Oregon, has announced plans for building a new automobile and passenger ferryboat for operation between Astoria and Washington beach points on the opposite side of the Columbia. No particulars have been made public.

Proposal to Convert Battleships for Training Purposes.—The House Committee on Naval Affairs on February 11 reported favorably on Bill H. R. 15139 authorizing the President to convert two warships into vessels for other use; the Wyoming to be converted into a training ship for the midshipmen at Annapolis at a cost of $510,000; the Utah to be made into a target ship at a cost of $269,000 and to be equipped for control by radio.

New Survey Vessel for Army Engineers.—The United States Army Engineers, San Francisco office, is planning the construction of a new survey and inspection vessel for use in Hawaii, bids for which are being asked from shipyards. The ship will be similar to the Suisun and will be 65 ft. long, 16 ft. beam, and of 40 tons displacement.

The boat will have twin screws and will be powered by diesel engines developing a total of 150-160 horsepower. Bids will be advertised about March 10.

Low Bidder for Survey Vessel.—Collingwood Shipbuilding Company, Collingwood, Ont., is reported to be the low bidder for construction of a hydrographic survey vessel for the Canadian Government Hydrographic Survey Service, Victoria B. C.

She will be 214 ft. long, 37 ft. beam, 13 ft. maximum draft, and is to be propelled by reciprocating engines driving twin screws to give a speed of 12 knots. She will be equipped with four gasoline launches, propelled by 25-horsepower Thorneycroft engines, three small outboard motors, two lifeboats, three dinghies for sweeping, and six dories for surf landings. All boats will be handled by Welin-MacLachlan automatic type davits. Complete navigating and surveying equipment is specified.

A similar vessel is planned for St. Lawrence Service.

Ford to Dieselize Ship Bought for Scrap. Permission was given the Ford Motor Company February 18 to convert the lake type steamship Lake Shawano to a motor ship. The vessel was one of 199 similar type ships purchased from the Shipping Board in 1925 with the understanding that they be scrapped or, in the case of ten of the ships, upon payment of an additional sum that they be converted into barges. In the case of the Lake Shawano, the Board has agreed to permit the Ford Company to convert the vessel to a diesel ship upon payment of this additional purchase price. The vessel is a steel cargo steamer of approximately 3300 deadweight tons.

Private Yards To Bid on Submarine.—The Secretary of the Navy will open bids at Washington, D.C., on April 16, 1931, for the construction of Submarine V-9. Bids have been asked from private American shipyards.

The Navy Department recently awarded contract to the United States Navy Yard, Portsmouth, New Hampshire, for the construction of Submarine V-8.

Displacement of the V-8 and V-9 will be 1100 tons each. This represents a reduction of tonnage from original designs, which called for a surface displacement of 1550 tons. Appropriations for the construction of the two submarines during the fiscal year ending June 30, 1931, total $2,800,000; and the present naval appropriations bill for the fiscal year 1932 provide for an additional $200,000.

The Navy Department now has Submarine V-7 under construction at the Portsmouth Navy Yard.

Ferryboat Construction Approved. — The City Council of North Vancouver, B.C., has approved a money by-law for the construction of a ferryboat to take care of the increased automobile traffic between Vancouver and the North Shore owing to the wreck of the Second Narrows Bridge. Several British Columbia shipyards have prepared plans and estimates for such a vessel.

Dredges to be Ordered by Army Engineers.—The U.S. Army Engineers office at St. Louis, Missouri, is planning the construction of three 192-ft. steam dredges to have steel hulls and 24-inch suction.

Some Recent Shipbuilding Orders

Large Steel Yacht Ordered.—The Craig Shipbuilding Company of Long Beach, California, has an order from W. J. Hole of Los Angeles for a fine new twin-screw, steel yacht designed by the well known naval architect Leslie E. Geary of Seattle and Los Angeles. The yacht is to be 146ft. long, 23.5 ft. beam, and 10.5 ft. draft. Her power plant will consist of two 500-horsepower Winton diesel engines connected to the two screws. She will have a cruising radius of 7000 miles at full 14 knots speed, or 10,000 miles at 12 knots. Her fuel tanks will have a capacity of 20,000 gallons of oil and her water tanks 11,000 gallons.

The yacht will have five double staterooms with baths between each two and an owner's large stateroom. She will carry a full complement of fishing boats and complete equipment for cruising in out-of-the-way places. Delivery is set for August of this year.

Mr. Hole is the present owner of the yacht Samona and has made some extensive cruises. Two years ago he made a cruise of 12,500 miles, including a 350-mile trip up the little-navigated Orinoco River.

Scow for Seattle Firm.—Johnson Shipbuilding Company of Seattle has an order for a 60-ft. scow for the P. E. Harris & Co., Seattle.

Lighthouse Tender Ordered.—The United States Bureau of Lighthouses of the Department of Commerce has recently placed an order with The Moore Drydock Company of Oakland, Calif., for a lighthouse tender to be 112 ft. 2 in. between perpendiculars, 25 ft. beam, 9½ nautical miles speed.

Bids for the propelling machinery of this tender, the Columbine, were opened at the office of the Superintendent of Lighthouses, San Francisco, February 17, and covered diesel-electric equipment with and without pilot house control. The bids were as follows:

I. P. Morris & De La Vergne, Inc., Philadelphia, Pa., $54,700, 230 days, with G.-E. equipment; $56,800 for same with Ward-Leonard control.

Standard Motor Construction Co., Jersey City, N.J., $42,059.25, 160 days, with G.-E. equipment; $44,159.25 for same with W.L. control.

Washington Iron Works, Seattle, Wn., $40,957, 180 days, for West. equipment, 400 R.P.M.; $43,192 for same with W.L. control; $44,330 for same with 525 R.P.M.; $46,476 for same at 525 R.P.M. and with W.L. control.

Superior Engine Co., Springfield, Ohio, $41,076, 180 days, and $41,126 for West. equipment at 500 and 450 R.P.M., respectively; $43,222 and $43,316 with pilot house control at 500 and 450 R.P.M., respectively; $300 addition for compressor.

Winton Engine Corp., Cleveland, Ohio, $39,450, 165 days with G.-E. equipment, rheostat control, 400 R.P.M.; $41,200 for same with W.L. control, 7½ K.W. ex.; $41,550 for same, 15 K.W. ex.; $40,410 and $42,645 for West. equipment and rheostat and W.L. control, respectively.

Worthington Company, Inc., Buffalo, N.Y., $40,780, 150 days with G.-E. equipment; $43,085 for same with W.L. control; $42,284 with West. equipment; and $44,644 for same with W.L. control.

Atlas-Imperial Diesel Engine Co., Oakland, Calif., $39,485, 170 days, with G.-E. equipment; $41,843 for same with W L. control.

The Cooper Bessemer Corp., Grove City, Pa., $38,898 and 70 days with Westinghouse equipment.

All prices are F.O.B. factory locations named.

Maine Yard Enters Large Orders. The Bath Iron Works of Bath, Maine, has received an order for a yacht similar to the one now under construction for Chas. E. Thorne of Chicago. The owner of the new yacht is unknown, but she will be 140 ft. between perpendiculars, 24 ft. 10 in. beam, 8 ft. 6 in. draft. She will be powered by two 400-horsepower diesel engines and will have a speed of 14 knots. Keel will be laid about March 15 and delivery is specified for July 15.

This yard has also recently received an order from the United States Coast Guard for ten twin-screw, steel patrol boats for inshore patrol work. They will be 165 ft. long, powered with diesel engines, and will cost $195,000 each.

Two Self-Propelled Canal Barges. The Great Lakes Engineering Works, River Rouge, Michigan, has received an order from the Ford Motor Company of Detroit for two self-propelled canal barges to be 290 by 43 by 10 ft. dimensions. They will be powered with geared turbines of 1600 indicated horsepower, driving them at a speed of 16 knots. Steam will be supplied by two water-tube boilers. The barges will be of 2000 tons deadweight capacity. Keels are to be laid in March.

Several Scows Ordered.—Manitowoc Shipbuilding Company, Manitowoc, Wis., has recently entered orders for several scows. One, 124 ft. over-all, is for Ed. E. Gillen Co., of Milwaukee; one is for U. S. Engineers Office, Chicago; and two are for the Great Lakes Dredge & Dock Co., 130 ft. long.

Diesel Tug Ordered.—The Spedden Shipbuilding Co., Baltimore, Md., has an order from the Atlantic Gulf & Pacific Co., of New York, for a 57-ft. steel hull, diesel tug. The tug will have a beam of 14 ft., loaded draft of 5 ft. 6 in. and will be powered with 120-horsepower Fairbanks-Morse diesel engine.

Keel Laid for Passenger Boat.—Keel was laid the middle of February by the Albina Marine Iron Works, Portland, Oregon, for a steel hull, tunnel-stern, passenger and freight vessel for the Harkins Transportation Company for operation on the Columbia River between Astoria and Portland. The vessel will be 160 ft. long, 30 ft. beam, and powered by a 500-horsepower Atlas-Imperial diesel engine. She will be named J. P. Hosford.

San Pedro Boatyard Gets Stock Order.—Fellows & Stewart, Terminal Island, San Pedro, Calif., has received an order from S. Clyde & Kyle Co., New York, for the construction of ten 38-ft. cruiser yachts. The owners maintain sales offices in New York, San Francisco, and Los Angeles. The cruisers are to have a beam of 9 ft. 4 in. and will be powered with a V-type motor giving a speed of about 14 miles an hour. The main cabin will have four berths with a seat in the pilot house that may be converted into a double bed.

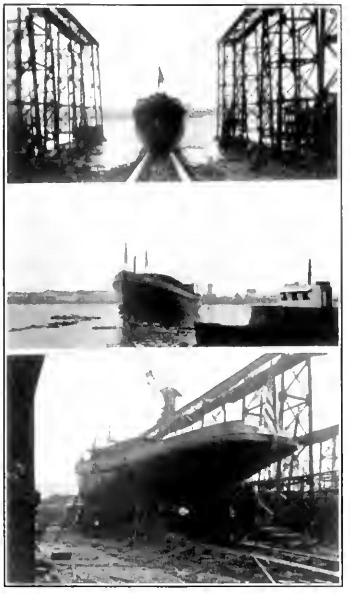
Important Tuna Fisher Ordered. The Campbell Machine Company, San Diego, Calif., has announced that a contract has been signed for the construction of a 135-ft. tuna fishing vessel for Joaquin O. Medina, M. O. Medina, and Sabino J. Inos.

The boat will have a beam of 28 ft. and a depth of 14 ft. She will be of the raised forward deck type, with accommodations for 16 men. The main engine power will be 500-horsepower, 6-cylinder Union diesel marine engine supplied by the Union Diesel Engine Company of Oakland, Calif. The auxiliary power will be supplied by a 3-cylinder, 75-horsepower Union diesel engine direct-connected to a 60-kilowatt, direct-current generator. An emergency 50-kilowatt generator will be provided, to be driven by the main engine or a 75-horsepower gas engine.

The refrigeration system will be a 15-ton York ammonia type system, driven by a 20-horsepower direct-current motor. Two bait pumps will be provided, 10 inches suction, 10-inch discharge Byron Jackson vertical pumps being specified.

Fuel tank capacity will be 25,000 gallons, providing a cruising range of approximately 10,000 miles. Campbell Machine Company manufacture cargo and anchor winches will be installed, as well as Campbell manufacture wireless set.

The vessel will cost about $125,000.



Above are three views taken at the launching of the twin-screw, steel towboat Mamo at the Potrero Works of the Bethlehem Shipbuilding Corp., Ltd., San Francisco, for Young Brothers of Honolulu. The vessel is 129.2 ft. long, powered by 750 H.P. Fairbanks-Morse Diesel engines.

Contract Let for Navy Cruiser.—The New York Shipbuilding Company, Camden, New Jersey, was awarded contract for Light Cruiser No. 37 by the Secretary of the Navy Charles Francis Adams. This yard was low bidder among private American shipyards for the construction of the cruiser, the bid being $10,450,000 for hull and machinery.

Two other bids were received by the Navy Department: one from the Newport News Shipbuilding & Drydock Company, $11,300,000; and one from Bethlehem Shipbuilding Corp., Ltd., Quincy, Mass., $10,695,000.

The limit cost of Cruiser No. 37 is set at $17,000,000, including armor and armament. This is the seventh of the 15 10,000-ton cruisers authorized by Congress in 1929. The vessel will be 600 feet in length, will have a mean draft of 17 ft. 7 in., and will be powered with engines developing a total of 107,000 horsepower. The personnel will comprise 49 officers and 553 enlisted men. She will carry nine 8-in. guns in three triple turrets.

This yard has a sister ship under construction, keel having been laid in March of last year—the Indianapolis, L. C. 35.

Order Placed for Lighthouse Tender.— The Manitowoc Shipbuilding Corp., Manitowoc, Wis., was awarded contract for construction of a lighthouse tender by the U. S. Bureau of Lighthouses, for which bids were opened December 10.

The tender, the Violet, will be 170 ft. over-all, 163 ft. 6 in. at water line, 32 ft. molded beam, 8 ft 6 in. draft, of 770 tons displacement. She will be powered by two vertical, triple expansion, surface condensing steam engines. The price bid was $371,000, less $11,750 for delivery at Manitowoc.

Leathem D. Smith Dock Company, Sturgeon Bay, Wis., was awarded contract for the construction of Lighthouse tender Cherry on a bid of $84,900.

Fish Patrol Boats Ordered.—Walkem's Shipyard, Ltd., False Creek, Vancouver, B. C., has been awarded contract for the construction of four patrol boats by the Canadian Department of Fisheries. The boats are to be 53 ft. long, and powered with 75-horsepower diesel engines supplied by the Tyee Machinery Company of Vancouver. The shipyard's low bid was for $39,980 for the four hulls. They will be for British Columbia service.

Reconditioning Job on Ferryboat. The Barbee Shipbuilding Company, Barbee, Wn., has been awarded contract by the Kitsap County Transportation Co., Seattle, for reconditioning the ferryboat Liberty at a cost of about $75,000. The upper structure of the vessel will be widened and reconditioned to accommodate 15 additional automobiles and the cabin for passengers will be rebuilt and a lunchroom installed.

Speed and efficiency of the ferryboat will be increased by the installation of an 8-cylinder, 600-horsepower Washington diesel engine manufactured by the Washington Iron Works of Seattle.

Portland, Maine, Fireboat Ordered.— Rice Brothers Corp., East Boothbay, Maine, has received contract from the City of Portland, Maine, for the construction of a fireboat to be 90 ft. length over-all, 22 ft. beam, 6 ft. maximum draft and powered by Cummins diesel engines. The boat was designed by John G. Alden of Boston and will cost $108,900.

Westinghouse Awarded Important Contract.—Following opening of bids at Navy Dept., Washington, on January 27, Westinghouse Electric & Manufacturing Co. has been awarded contract for the complete geared turbine propelling machinery for Scout Cruiser No. 38 to be built by the United States Navy Yard, Mare Island, Calif.

The Westinghouse company has also had an order from the U. S. Army Transport Service at San Francisco for four 150-kilowatt turbine generator sets, two each of which will be installed on the transports Somme and Cambrai.

Pilot Boat Award.—Al. Larson, boat builder of San Pedro, California, has received contract from the Harbor Commissioners for the Harbor of Los Angeles, for the construction of a new pilot boat to cost $49,650. The boat will be 64 ft. long, 15 ft. beam, and powered by a 210-horsepower Fairbanks-Morse diesel engine, giving a speed of 14 knots. Her equipment is to include comfortable accommodations for crew, and electric galley and electric refrigerator.

Shipyard News

Expansion at Moore Yard.—Due to the heavy volume of ship repair work which has taxed the capacity of the Oakland estuary yard of The Moore Dry Dock Company, a program of betterment is now being undertaken, according to an announcement by William Harrower, superintendent for the Yard. Two wharves are being entirely rebuilt and extended, and will have electric traveling cranes running their full length. Plans are also being made for an additional floating drydock and other improvements to take care of the increasing business.

Cruiser Yacht Building.—Wilmington Boat Works, Wilmington, Calif., has an order for a 75-ft., twin-screw, cruiser yacht, the Joyita, for Roland West. The cruiser was designed by L. E. Geary of Los Angeles and Seattle, and will be powered by two 120-horsepower Atlas-Imperial diesels. The hull will be of Alaska cedar, the decks of teak, with Spanish style interior finish. She will have a cruising radius of 4000 miles.

Tuna Clipper Magellan Launched.—The San Diego Marine Construction Company recently launched the 102-ft. tuna boat Magellan. She was designed by Dean B. Johnson, manager of the boat works, and has a modified clipper bow. Power will be supplied by a 350-horsepower Atlas-Imperial diesel engine, giving her a speed of 12 knots. She has a cruising radius of 6000 miles and refrigerated hold capacity of 115 tons of iced fish.

Tuna Vessel Launched.— The Tuna clipper Europa was launched last month by the Campbell Machine Company for Captain M. Crivello, owner of the fishing vessel G. Marconi. The Europa is of advanced design, a new method of handling the raised-deck type of hull being employed. She is powered by a 350-horsepower 6-cylinder, Union diesel engine.

New York-Caribbean Vessel Completed.— The steamer Borinquen has just been completed by the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., for the New York and Porto Rico Line, subsidiary of the Atlantic, Gulf & West Indies Steamship Lines of New York, the vessel arriving in New York on February 22, whence she sailed on her maiden voyage to San Juan and Santo Domingo.

The vessel was designed by Theodore E. Ferris of New York and is similar to the steamship Coamo. She is 414 ft. between perpendiculars, 59 ft 3 in. beam, 23 ft 6 in. loaded draft. She is of 7000 tons gross, with deadweight carrying capacity of 4500 tons. The Borinquen is powered by single reduction geared turbines, of the impulse-reaction type, of about 6500 horsepower. Steam is supplied by oil-fired water-tube boilers at a working pressure of 375 pounds and with 650 degrees Fahrenheit total temperature.

Pioneer Shipbuilder Passes.—Word has been received that Oscar Sandahl, who was well known all along the Pacific Coast as a shipyard superintendent of considerable ability, died in Seattle February 11 at the age of 73 years. Sandahl was a native of Sweden and came to Seattle 58 years ago. He was engaged in shipyards in practically every port on the Pacific during his career, one of his last jobs being in charge of construction of the ocean-going tug Mahoe, built for Young Brothers of Honolulu by the Ballard Marine Railway Company of Seattle.

Tugboat with Geared Turbine Drive Ordered.—An epochal advance in transportation machinery on the Great Lakes is marked in an order from the Great Lakes Dredge and Dock Company of Chicago for a large tug boat propelled by a geared turbine drive from the Manitowoc Shipbuilding Corp. The turbine machinery, the first of this type to be installed in a Great Lakes vessel, will be manufactured by the Westinghouse Electric and Manufacturing Company, and will use steam at the highest pressures ever tried in a vessel of this type. Innovations in rapid handling of the turbine and steering for rapid maneuvering will be among the progressive features incorporated in the tug, which is expected to be placed in service by early summer.

Loans Authorized.— Loans of $400,000 and $169,340 were granted the Dollar Steamship Lines and the Agwi Navigation Company, respectively, by the Shipping Board February 18 for use in the installation of hotel equipment on vessels now under construction for these companies at the Newport News Shipbuilding and Drydock Company, Newport News, Va. The loans are supplemental to loans previously granted in aid of building these vessels and, added to the previous loans, represent three fourths the total cost of the ships.

Dravo Submits Summary for 1930. According to an announcement received recently from the Dravo Contracting Company of Pittsburgh, Pa., this company turned out a total of 124 hulls, with a total gross tonnage of 39,076 during the year 1930, and started the year 1931 with a total of 25 hulls of 12,246 gross tons under construction.

Out of the 124, 109 of the hulls were barges for various types of cargo; there were five towboats built during the year, one grain elevator, one anchor boat, one dredge, two car floats, and four derrick boats.

New Engines for Chaser. — Bids were opened by the U.S. Coast Guard, San Francisco, for two 200-H.P. gas engines for installation in the patrol boat Imp stationed at San Pedro. Low bid was by Hall-Scott Co., $2637 for the two engines.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of February 1, 1931

Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd.
Union Plant, San Francisco

Hull 5347, steel barge for Young Bros., Ltd., Honolulu, Hawaii; 175x44x11 ft.; keel 2/20/31 est.

Hull 5348, same as above; keel 2/20/31 est.

Mamo, hull 5349, steel tug for Young Bros., Ltd., Honolulu; 129'3" L.O.A.; 28 beam; 15 draft; Fairbanks-Morse 750 I.H.P. diesel engs.; **launched 2/14/30.**

Hull 5350, pineapple barge for Inter-Island Steam Navigation Co., Honolulu; 175 x 44 x 11 ft.; keel 3/2/31 est.; launch 4/21/31 est.; deliver 5/1/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30; launch 3/1/31 est.

Not named, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft; two 500 H.P. Winton diesel engs.; deliver Aug./31 est.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

Shoshone, No. 24, diesel - electric cutter for U.S. Coast Guard; 250x42x15 ft.; Westinghouse turbines and motors; 3000 S H.P.; keel 3/15/30; launched 9/11/30; **delivered 1/3/31.**

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; keel 3/15/31 est.

JOHNSON SHIPBUILDING CO.
329 Willow Street, Seattle, Wash.

Purchasing Agent: Geo. H. McAteer.

Hull J 79, scow for P. E. Harris & Co.; 60 x 16 x 4 ft.; **keel 1/18/31;** launch 2/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Not named, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

Not named, vee-bottom wooden pleasure cruiser for L. W. Kengin, Prince Rupert; 34 L.B.P.; 8 beam; 2'9" depth; 10 knots speed; 34-B H P. Redwing eng.; keel 11/1/30.

Bobolink, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L B.P.; 29 beam; engs. from old Bobolink; keel 12/8/30; deliver 3/8/31 est.

Not named, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8'6" molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; keel 2/15/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Louisville, light cruiser CL-28 for United States Navy; 10,000 tons displacement; keel July 4/28; launched 9/1/30; deliver Mar. 13/31 est.

Astoria, light cruiser CL-34, same as above; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

Chicago, light cruiser CL-29 for United States Navy; 10,000 tons displacement; launched 4/10/30; deliver 3/13/31 est.

V-6, submarine SC-2 for U. S. Navy; launched 3/15/30; deliver 9/10/30 est.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., LTD., Union Plant

Drydock and misc. repairs: U.S.S. California. Drydock, paint, misc. repairs: stmrs. Frank G. Drum, Manukai, Paul Shoup, Richmond, Wilhelmina, D. G. Scofield, President Monroe, Solana, Chetopa, Bandon, Alvarado, J. C. Fitzsimmons, Mericos H. Whittier, Point Loma, Admiral Sebree, Cascade, Marit, Harvard, m.s. Silverelm, Silverhazel, Varanger, Sveadrott, ferry Golden West, U.S.S. New York, U.S.C.G. Golden Gate, dredge Golden Gate, tug Gov. Irwin, Restless, Shell Barge No. 9, launches Rainbow, Panama, San Lucas, Standard No. 2, Columbus, yacht Talayha. One H P. cylinder: Dorothy Alexander. Four C.I. propellers: Argyll. One forged steel tailshaft: Manukai, Daisy, Gadsby, Celilo (also misc. repairs). New fire box: Petroleum No. 3. Repair deck steam line: La Purisima. Clean out 16 fuel oil heater coils: Tamaha. Pipe repairs: Satanta. Make and furnish 1 wildcat: La Brea. Repair cargo winch: Scalaria. Caulk rivets: Shabonee. Misc. repairs: stmrs. Belgenland, San Jose, Point Sur, Pennsylvania, President Jefferson, Saramacca, Makura, Esparta, Boliver, Point Arena, San Mateo, Admiral Rogers, City of San Rafael, Santa Inez, Daisy Gray, Silverspruce, Trocas, Nora, Tejon, Point Breeze, Topila, Scalaria, Standard No. 2, Otokia, Axel Johnson, Cubore, Roman Star, Lio, San Salvador.

JOHNSON SHIPBUILDING CO.,
Seattle, Wn.

New trunk cabin over engine: Burmuda. New engine bolts, lead sleeve, general overhaul: Amelia. General overhaul, new shaft: Trojan, Maryhovoi.

THE MOORE DRY DOCK CO.,
Oakland, Calif.

Drydock, clean, paint, misc. repairs: Davenport (caulk seams and butts, unship rudder, caulk rudder trunk, fit graving piece in planking, misc. engine and deck repairs). Maunala (range anchor chains, caulk seam and rivets in shell, misc. eng. and deck repairs). Nelson Traveler (overhaul sea valves, misc. engine repairs). Ohioan (also caulk misc. shell rivets), Minnesotan (recondition rudder pintles, recement propeller, caulk misc. rivets and seam). W. P. Barge No. 2 (also renew deck planking, fenders, caulk hull etc.). Golden River (caulk misc. rivets and seam, repack stern gland, overhaul sea valves). Axel Johnson, Virginian (also faired 2 propeller blades, misc. engine and deck repairs), fire tug David Scannell, Iriquois, (also repair misc. fenders, planking, etc.), Philippine, Missourian (repair anchor chains, caulk and welded rivets in shell, overhaul sea valves). Roseville (draw stbd. tail shaft, repair damaged bulwark, misc. engine and deck repairs), Willfaro (also repair rudder by reconditioning pintle, caulk rivets and seam in shell and tank tops, repack stern gland), Virgil G. Bogue (also caulk seams, install graving pieces and hull planking, renew iron bark stem and section of keel; also misc. engine repairs), Mikiki (also misc. eng. and deck repairs), Golden Gate dredger (also caulk hull, renew sections of fenders, planking, etc.), Calif. Hawaiian Sugar Ref. barge, Golden Peak, Makawao, (also overhaul sea valves, caulk misc. rivets and seam). Diana Dollar (also drew tail shaft, replace shaft with a spare, caulked and renewed misc. rivets, overhauled sea valves). Frank H. Buck (install new blade on propeller hub, wedged wear down of tail shaft; overhaul sea valves and repack stern gland), Tulsagas (also caulk rivets, seam, repack stern gland, overhaul sea valves, misc. repairs), Buffalo Bridge (also overhaul sea valves, repack stern gland, caulk and renewed rivets in shell, other misc repairs), Nordanger (also draw stbd. tail shaft, removed propeller to shop, welded and straightened blades, checked pitch, renewed rivets in bilge keel, rewooded stern bearing, misc. eng. repairs). Drydock for survey, washed off, and caulked hull: Cleone. Drydock for renewal of shell and deck plating, house, piping, overhaul engines due to fire, clean and paint, misc. repairs: Redline.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Misc. repairs and overhaul: Prince William. Docked for bottom painting and general overhaul; tailshaft drawn: Canadian Winner. Docked, cleaned, painted, misc. hull and engine repairs: 3 fishing boats. Misc. hull and engine repairs not requiring docking: 34 fishing boats. Docked, cleaned, painted: Rupert Marine Products scow.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle, Wn.

Drydock, clean, paint, etc.: stmrs. Capac, Depere, Diamond Cement. Drydock for survey, cleaning, painting: stmr. Dochet General overhaul: U.S.C.G. Haida. Drydock, misc. repairs: tug Iroquois. Fire damage repairs: Maliko. Drydock for survey, misc. repairs account of grounding: Navasota. Misc. grounding repairs: Northland. Dry-dock for survey, misc. repairs: Point San Pablo, Point Sur. Voyage repairs: President Grant, President McKinley. Grounding repairs: Tuscalusa City.

U. S. NAVY YARD, Bremerton, Wn.

Misc. repairs and docking: Lexington, Tennessee, Twiggs, Greer, Buchanan, Culebra. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x26x11 ft.; 5 delivered July/30.

Ten barges for Inland Waterways Corp., Washington, D.C.: 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931.

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.: 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; **keel 1/1/31;** deliver 3/31 est.

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named; 168 L.B.P.; 26 beam, 9 draft; twin Winton diesel engs.: 1600 I.H.P.

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launch 4/10/31 est.

Aras, hull 139, diesel yacht, Hugh J. Chisholm, 243'9" L.O.A. 227'3" L.W.L.; 36 beam; 21'7" depth; 2 Winton 1100 B.H.P. diesel engs.: keel 5/19/30; launch 12/8/30; **delivered 1/15/31.**

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30; launch 4/15/31 est.; deliver 4/25/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.: keel 9/1/30, launch 6/20/31 est.; deliver 8/10/31 est.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B.H.P. Fairbanks-Morse diesel eng.; keel 10/15/30; launch 3/20/31 est.; deliver 4/25/31 est.

Maine, hull 143, sister to above; keel 10/18/30; launch 3/20/31 est.; deliver 4/25/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30.

Delecta, hull 145, diesel-electric yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.: **keel 1/13/31.**

Not named, hull 146, twin screw steel yacht, owner not named: 140 L.B.P.; 24'10" beam, 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/16/31 est.: deliver 7/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard: 165 ft. long; diesel eng.: **keel 4/25/31 est.; deliver 11/29/31 est.**

Hull 148, same as above; keel 4/25/31 est.: deliver 12/24/31 est.

Hull 149, same as above; keel 4/25/31 est.; deliver 1/18/32 est.

Hull 150, same as above: keel 4/28/31 est.; deliver 2/12/32 est.

Hull 151, same as above; keel 4/28/31 est.; deliver 3/9/32 est.

Hull 152, same as above, keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 6/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hulls 4268-4273, six steel oil barges for Lake Transport Corp.; 4271 launched 5/22/30; 4270 launched 6/20/30; 4272 launched 6/27/30; 4268 launched 7/20/30; 4273 launched 9/10/30.

Hull 4274, steel carfloat for Central R.R. of New Jersey; launched 9/26/30.

Hulls 4277-4278, two steel barges for Baltimore and Ohio R.R.; launched 9/19-9/29/30.

Not named, hull 4280, steel oil tanker for Gulf Refining Co.

Not named, hull 4281, same as above; **launched 12/17/30.**

Hull 4283, steel barge for The Arundel Corp.

Hull 4284, steel barges for Western Maryland Railway Co.

Hull 4285, same as above.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel ferryboat for the Seaboard Air Line: 65 x 22 ft., 120 H.P. Fairbanks-Morse eng.

One all-welded steel yacht, owner not named: 50 x 13 ft.; diesel eng.; keel 11/30.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2962, 80-ft. cruiser for J. T. McMillan, Detroit, 2 300 H.P. Speedway engines.

Hull 2994, 81-foot commuter boat for N. B. Woolworth; 2 300-H.P. Speedway engines.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Danora, hull 145, steel yacht, owner not named: 108 L.B.P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30; launch 4/15/31 est.; deliver 5/1/31 est.

Rosewill II, hull 146, steel yacht, owner not named: 126 L.B.P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30.

Ber-clo III, hull 147, steel yacht for E. S. Close, Toledo; 106 L.B.P.; 17'6" beam; 6 loaded draft; 14 M.P.H.; 98 D.W.T.; 300 I. H. P. diesel eng.; keel 11/25/30; launch 4/15/31 est.; deliver 5/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hulls 1064-1065, two 50-ton whirler derrick boats for New York Central Railroad.

Hulls 1067-1072 incl., six misc. cargo barges for stock; 130x30x8'6".

Hulls 1074-1083 incl., 10 hopper type steel coal barges for stock.

Hull 1084, 50-ton whirler derrick boat for Erie Railroad Co.

Hull 1085, one steel derrick barge for Atlantic, Gulf & Pacific Co., 60x30x6 ft.

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Hull 119, steel harbor barge for stock; 175x36x12'7-1/8"; keel 5/19/30.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary). 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers.

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 water-tube boilers; keel 3/1/31 est.; launch 5/1/31 est.; deliver 6/15/31 est.

Hull 277, sister to above, keel 3/10/31 est.; launch 5/15/31 est.; deliver 7/1/31 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One steel wharf barge for City of Rock Island, Ill.; 230x45x7'9"; launched 11/3/30; **delivered at Cairo, Ill., 2/2/31.**

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; keel 2/15/30 est.; launch 3/15/31 est.; deliver 4/15/31 est.

One towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 5/1/31 est.

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer.

Hull 261, car ferry for Milwaukee Ferry Co. (Grand Trunk R.R.): 343x56x21'6"; 14 mi. speed; 2200 D.W.T.; 2 recip. steam engs.; 3600 S.H.P.; 4 Scotch boilers, 14'6" x 12'; keel 7/12/30; launched 11/25/30; **delivered 1/15/31.**

Not named, hull 268, steel tug, for Great Lakes Dredge & Dock Co.; 115 x 26 x 15 ft.; one Babcock & Wilcox boiler; 850 H.P. turbine with reduction gear; **keel 1/12/31;** deliver 5/31 est.

Hull 269, dump scow for Ed E. Gillen Co., Milwaukee; 124 L.O.A.; 30 beam; 11'6" depth.

Hull 270, deck scow for U. S. Engineers, Chicago; 56 x 20 x 4'8".

Hull 271, deck scow for Great Lakes Dredge & Dock Co.; 130 x 40 x 9 ft.

Hull 272, same as above.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x 26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S Engineering Office, New Orleans: 65'6"x 17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

All-welded steel barge for Inland Waterways Corp., 1016 Munitions Bldg., Washington, D.C.; 230 length on deck; 45 ft. molded beam; 11 ft. molded depth, keel laid.

Steel oil tanker for Victor Lynn Transportation Co.; 210 gro. tons; keel 12/30.

Two barges for E. T. Slider, 120x30x 7'6".

Ten barges for U. S. Engineers, Rock Island, Ill.; 110x24x5 ft.

Five barges for Inland Waterways Corp., Washington, D.C.; 230 x 45 x 11 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 240, deck barge for Bedford Nugent Co.; 100x26x6'6"; keel 8/15/30; launched 9/17/30.

Hull 241, same as above; keel 8/28/30; launched 9/26/30.

Hull 242, same as above; keel 8/30/30; launched 10/1/30.

Hull 243, same as above; keel 9/4/30; launched 10/6/30.

Hull 244, deck barge for stock; 100x26 x6'6"; keel 10/20/30; launched 12/4/30.

Hull 245, same as above; keel 11/6/30.

Hull 246, same as above; keel 11/13/30.

Hull 247, same as above; keel 11/16/30.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31.

Hull 249, same as above; **keel 1/17/31.**

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; keel 3/12/31 est.; launch 4/7/31 est.

Hull 251, deck barge for Bedford-Nugent Co.; 110x28x7'3" depth; keel 3/2/31 est.; launch 3/16/31 est.

Hull 252, same as above; keel 3/9/31 est.; launch 3/23/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 233 Broadway, New York City.

Augusta, hull 324, light cruiser CL-31 for United States Navy: 10,000 tons displacement; keel July 2/28; launched 2/1-30; **delivered 1/30/31.**

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 8/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; **launched 2/21/31.**

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; launch 3/7/31 est.; deliver June/31 est.

Not named, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; **keel 2/2/31;** launch 9/31 est. deliver 1/32 est.

Not named, hull 345, sister to above; keel 3/31 est.; launch 11/31 est.; deliver 4/32 est.

Not named, hull 346, sister to above; keel 5/31 est.; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Exochorda, hull 395, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 11/25/29; launched 10/18/30; **delivered 1/15/31.**

Exeter, hull 396, sister to above; keel 8/11/30; launch 3/1/31 est.

Excambion, hull 397, sister to above; keel 10/25/30; launch 8/1/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel spring/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; launch and deliver 3/15/31 est.

Not named, hull 1049, two steel, single-screw, harbor tugs for stock; 92 L.B.P.; 23 beam; 12'6" loaded draft; steam eng. 1 Scotch boiler; keel 12/2/30.

Not named, hull 1050, same as above; keel 12/2/30.

Not named, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; keel 2/12/31 est.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 269, steel hull diesel tug for Atlantic, Gulf & Pacific Co., New York; 57 L.B.P.; 14 beam; 5'6" loaded draft; 120 H.P. Fairbanks-Morse diesel eng.; keel 2/10/31 est.; launch 3/10/31 est.; deliver 4/1/31 est.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Northern Sun, hull 131, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 7/15/30; **launched 1/31/31;** deliver 2/12/31 est.

Not named, hull 132, sister to above; keel 8/21/30;; launch 3/21/31 est.; deliver 4/1/31 est.

Not named, hull 133, sister to above; keel 9/17/30, launch 6/13/31 est., deliver 7/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 127, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 11/13/30; launch 5/16/31 est.; deliver 6/1/31 est.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft. **keel 2/9/-31,** launch 6/1/31 est., deliver 6/15/31 est.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Not named, hull 50, steam ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 600 I.H.P.; 2 W.T. boilers; **keel Jan./31.**

Not named, hull 51, sister to above; **keel Jan/31.**

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; **keel Jan./31.**

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3220 I.H.P.; 2 W.T. boilers; keel 3/2/31 est.; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; **keel 1/31/31;** launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30; **deliver** 3/15/31 est.

Vesta, hull 89, sister to above; keel 10/9/30.

Purse Seiner Launched.— The Barbee Drydock & Shipbuilding Co., Barbee, Wn., recently launched a 56-ft. purse seiner for Richard Suryan of Anacortes. The boat is powered with an 80-horsepower Washington-Estep diesel.

This yard also is building a 76-ft. tender for the Davis Brothers of Juneau, Alaska, to be powered with a 170-horsepower Atlas-Imperial diesel.

Columbia River Navigation

(Continued from Page 114)

Engineers, who was largely responsible for the success of the channel work, and James H. Polhemus, engineer of the Port of Portland Commission, have become well known wherever men gather to discuss river improvement.

Meanwhile plans were set up for construction locks at the Cascade Rapids on the Columbia, where the entire flood tumbles over the site of the mythical Bridge of the Gods, 58 miles (by river) from Portland, and for a canal and locks around The Dalles, 45 miles farther upstream. At the former site the Columbia is partially dammed up by a great lava flow which in bygone ages crossed the river and solidified. This obstruction has been eroded into numerous deep, narrow slots through which the river runs with a fall of 81 feet distance of about eight miles.

Citizens of both Washington and Oregon were determined that a system of locks should be built at both of these rapids so that under certain stages of water clear navigation would extend to Lewiston and to Priest Rapids, or about 710 miles, under certain stages of water, clear to Rickey Rapids.

Congress was finally persuaded to build the locks at Cascade Rapids, near the deepest part of the Columbia River Gorge, where the river takes its last plunge to tidewater, about 145 miles from the Pacific. These locks were finished in November 1896, at a total cost of $4,000,000. There are two locks, upper and lower chambers. The upper chamber is 521 x 90 x 14 ft., while the lower is 514 x 90 x 46 with a total lift of 24 ft. and a low water draft of 8 ft.

Completion of the Cascade locks brought river boat navigation up to The Dalles, 44 miles farther. In 1908 work was authorized by Congress toward the construction of The Dalles-Celilo canal. This canal is approximately nine miles long, with five locks with a total maximum lift of 90 feet, and depth of 8 feet over the sills. This improvement was finished in 1915 at a total cost of approximately $6,000,000.

Waterfront Lewiston, Idaho, at the junction of the Snake and Clearwater rivers.

The World War closed these efforts temporarily, and it is only very recently that, after spending considerable money, time and effort in the work of fact-finding commissions, the states of Oregon, Washington, and Idaho are again actively working with Congress to put through the necessary appropriations to start work on the larger scheme of canalizing the entire Columbia and Snake River systems.

A Well Lighted Ship

(Continued from Page 98)

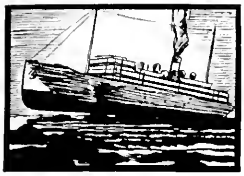
foyer is installed with the same general placement. On the center tables are placed portable lamps consisting of a silver plated base and three imitation candlesticks with 25-watt Mazda lamps surrounded by shirred silk shades of peach tint. Similar single-light table lamps are used on the side tables.

Adjoining the dining room is the all-electric galley and pantries. Here the lighting equipment should be of a distinctly utilitarian type. High level illumination is necessary, and the fixture used must be such as to uniformly distribute this light, at the same time not be affected by steam and other vapors. Vapor-proof fittings close to the ceiling are used. In these are placed holophane prismatic light directors. Those in the galley are the 150-watt size and outlets are so placed as to avoid ceiling obstructions and provide maximum light where most needed. Special lighting is provided beneath the overhanging hood of the range by four 50-watt units. In the pantries 60-watt fittings of the same type are utilized. Four outlets are placed over the counters to minimize shadow effects.

As will be seen from this brief description, discretion has been used throughout in cooperatively planning the decorations and lighting of this ship. These two elements must go hand in hand. Utility of lighting has been given consideration and high level illumination provided where it is essential for efficient working. The installation does not represent the ultimate that we may hope for in American ships, but it is a most decided step in the right direction. If one may predict our ships of the future will take advantage of the experience of the past and will combine this experience with the dreams of the modernist.

Gulf Conference Stable

C. Y. ROBERTS, secretary, Gulf Intercoastal Conference, New Orleans, Louisiana, announces that while it is reported that rate conditions in the North Atlantic intercoastal trade are becoming somewhat unsettled due to recent disbanding of the United States Intercoastal Conference, stable conditions will continue to exist from United States Gulf ports. The Gulf Intercoastal Conference is working in complete harmony and will keep stable rates at the disposal of its shippers and consignees.



Marine Insurance

Edited by James A. Quinby

Why Let 'Em Live?

A Diatribe Written Under the Influence of Indignation

IN days of old, when profits were entered in black ink instead of red and underwriters had not invented the standard clause and stabilized rate, a marine insurer was forced to the possession and daily use of a modicum of native intelligence. A portion, at least, of this intelligence was employed in estimating and valuing the measure of risk involved in the carriage of goods by various types of vessels. The older cases before English courts are peopled by shadowy figures, the leading Lloyd's and company risk and rate men of other days, who knew the vessels which carried their goods. If the so-called good ship Six Brothers was a leaky, worm-eaten old rat-trap, the rate on cargo carried by her went up accordingly.

In the present era of prohibition and competition, things are different. Anything that floats even momentarily can set forth with a full cargo of refined gentle, and high-bred merchandise which, even under normal conditions, suffers from perennial nervous titillation of value. Besides, things are so arranged that, when some of it gets within smelling distance of sea water, the salvage value is invariably reduced by a falling market on the sound commodity. In spite of this set-up, the innocent cargo insurer makes little or no distinction in the wide range of quality represented by the bottoms available to carry his client's goods.

Hull Risks Selected

This criticism does not apply with equal force to hull and P. & I. underwriters, who have been taught by bitter experience the necessity of selecting and valuing their risks. If a broker wanders up and down the street trying to peddle a hull policy on the ancient and honorable schooner Mary X, or some other museum piece, he is very apt to wend his way homeway at close of day with fallen arches and a renewed concept of man's inhumanity to man.

But let the Aztec and Scandahoovian Novelty Company offer a ten thousand dollar consignment of lace-trimmed silk flapper-gadgets for shipment by the Mary X, and the underwriters on their open policy will swallow the risk without blinking an eye. There is, of course, the usual polite chatter concerning "full-powered steamer and/or motor vessel," but the boys in the huddle know that this high-sounding phrase is formidable but not loaded. In the case of a great number of the peripatetic dog-hole dodgers that infest the Pacific Coast, the most that could really be warranted is that they haven't sunk—yet.

An honest and responsible steamship owner spends millions of dollars providing first-class equipment, and what good does it do him? Shippers who don't know one ship from another (which unfortunately describes the majority of shippers) will accept a cigar and a rate from the booking agent of the Sink or Swim Steamship Company; and their cargo insurers will say nothing and take it on the chin.

This is written with absolute confidence that no steamship owner who reads it will take exception. He can't without admitting membership in an undesirable classification. And no slur is intended for those outside that classification. It is a well known fact that the best of ships may have collisions or tangle with the shore-line every so often. If it were not for this proclivity, marine insurance would be unnecessary.

The major casualties to efficient and seaworthy vessels are normal in their expectancy. We read in the text-book that such accidents are "fortuitous in nature." But if a wooden steam schooner, designed for the lumber trade in the first place, puts out to sea with a cargo of general merchandise, and takes water through her seams in ordinary weather, there is nothing fortuitous about it. It would constitute an accident if the goods arrived sound. And yet our cargo underwriter admits the seaworthiness of the vessel, as between himself and his assured, and relies upon the questionable right of recovery by subrogation from the carrier. And the carrier, if all else fails, may rest secure in his right to limit his liability to the value of his vessel after the accident, which may well be nothing at all.

Names

The ancient Phoenicians were sailors of note
From the purple-hued ramparts of Tyre.
To be known through the ages for handling a boat
Is a fame which the English desire.

But out on the Coast in the lumbering trade
By the edge of the western sea,
Where corpses and widows and heroes are made,
These are the names you see—

These are the names that share in the fund
Of fame that seamen achieve,
Christofersen, Olson, Gustafson and Lund,
Johannsen, Knudsen, and Greve.

J. A. Q.

And Another Thing—

Nor is the coastwise traffic the only field where cargo interests have a blind spot. Our harbors and inland waterways are filled with water-logged and creaking wooden barges, a great number of which are unfit to carry telegraph poles or pig-iron. One of these out-worn hulks may be worth a few hundred dollars, and yet we allow it to load and carry a thirty-thousand-dollar cargo of sugar or some other valuable commodity for transshipment at a deep-water port to a first-class liner. There is something radically wrong with the picture.

The layman is addicted to the naive assumption that all craft are seaworthy or the government wouldn't let them leave port. In justice to the U. S. Inspectors, whose task is Herculean, it must be pointed out that barges are not subject to classification, and even ocean-going vessels may technically be entitled to operate, provided their type of construction was satisfactory as of the date they were built. The government inspection service cannot be expected to be too stringent, especially as to vessels which do not carry passengers. On the single point of age, however, it seems not unreasonable to hope for some official standard of obsolescence.

What To Do?

Cargo interests cannot, however, expect the federal authorities to protect them against the unfit barge or the leaky coasting vessel which turns up voyage after voyage with cargo damaged by sea water. With the unsavory records of these antediluvian wrecks at their disposal—nay, in their very files—cargo underwriters should establish an experience rating system and refuse to write cargo carried on questionable vessels, save at an adequate premium. If such a system were instituted (and there is no reason why the machinery of the Board of Marine Underwriters of San Francisco should not operate as a cargo carrier's rating bureau) the worst of these open-work packets would soon be permanently tied up for lack of patronage.

Such a move would have the support of the better class of carriers, for whom it would mean increased traffic, and of all intelligent shippers, for no honest shipper wishes his cargo damaged, even if it is insured.

Amending "Inchmaree Clause"

THE so-called "Inchmaree Clause," (Clause 8 of the English Institute Time Clauses—Hulls) has for the past few years read as follows:

"This insurance also specially to cover (subject to the free of average warranty) loss of or damage to hull or machinery directly caused by accidents in loading, discharging, or handling cargo, or caused through the negligence of Master, Mariners, Engineers, or Pilots, or through explosions, bursting of boilers, breakage of shafts, or through any latent defect in the machinery or hull, provided such loss or damage has not resulted from want of due diligence by the owners of the Ship, or any of them, or by the Manager, Masters, Mates, Engineers, Pilots, or Crew not to be considered as part owners within the meaning of this clause should they hold shares in the steamer."

Two of the governing bodies of the marine insurance fraternity in London and New York have recently announced minor changes in the clause, which was originally adopted after the Investigator and Inchmaree cases to protect vessel owners from damage arising from explosions and breakage of machinery.

The Institute of London Underwriters, after the words "discharging or handling cargo," have now inserted "or in bunkering or taking in fuel." This appears to be a minor extension of coverage, entirely justified by the similarity between loading and bunkering.

American hull underwriters, through their institute committee on forms and clauses, have adopted the same amendment and a further extension allowing coverage for damage caused by "riots, explosions (whether on board or elsewhere)." After the words "latent defect in machinery or hull," however, the American hull form will hereafter read "(excluding, however, the cost and expense of repairing or renewing the defective part)."

The latter restriction clarifies a disputed point which has arisen in numerous cases since the adoption of the clause. These cases have decided that the words "damage to hull or machinery . . . . caused . . . . through any latent defect" do not cover a case where the defective part is the only part affected. For example, if an engine bed-plate develops a crack resulting from a hidden fault in casting and has to be renewed or replaced, there can be no recovery under the policy, since there is no "damage to hull or machinery caused through" the defect, but merely a development of the defect itself. The new phrase merely sets forth a restriction which the law had heretofore implied.

As the new phrase occurs only after the latent defect section, however, can it not be argued that it applies only to that section, and consequently does not apply to the bursting of boilers and breakage of shafts? Is not the assured in a better position than before to recover for replacement of a broken shaft? We do not know; but someone will doubtless try the point out before long.

English Inchmaree Case

An interesting case on a special Inchmaree clause recently decided in the English Kings Bench Division throws light on the type of problem met by the American amendments. The case is McColl and Pollock, Ltd., vs. Indemnity Mutual Marine Assurance Co., Ltd., and concerns the interpretation of a hull policy clause reading as follows:

"This insurance also specially to cover the cost of repairs, and/or loss of and/or damage to the interest through the negligence, incompetence, or culpability of superintendents, foremen, workmen, harbor, dock or quay authorities, servants, and employees of the assured or any other individuals in, near, or about the thing insured or through theft, explosion, bursting, or collapse of boilers, breakage of shafts or through any latent defect in the thing insured or in the machinery, plant or gear in use."

In the course of fitting new cylinders in the steamship Badjestan, a latent defect was discovered in one cylinder. This cylinder was taken out and replaced; but the second cylinder also proved defective. The third time proved a charm, but the cost of two replacements amounted to a substantial sum, which the owners sought to recover under the "cost of repairs" phrase in their policy.

The court held that the loss was not recoverable, since the discovery of the defective condition of successive cylinders was not connected with any casualty, without which a claim cannot succeed under a marine policy.

Paying the Other Man's Bills

VESSEL owners chartering vessels frequently believe that thereby they escape responsibility for fuel and supply bills and pass it on to those who hire and operate the vessel. It will surprise such vessel owners to find that, notwithstanding they do not operate their own vessels, they may nevertheless have to pay some of the operating expenses, even though by the terms of the charter party the charterer has agreed to discharge all bills.

The owners of the Norwegian steamer Golden Gate have just had a judgment rendered against them for $22,231.71 because of fuel bills incurred by the lumber company who chartered the vessel, the lumber company later going into a receivership.

It is an old fiction of the admiralty law that a vessel is to be treated as a person. The vessel as such a person is often deemed herself to be contracting bills incurred on her account and the basis for libeling the vessel in rem is often found in this theory. The theory that the vessel itself may be seized for supplies furnished it in effect means that the owner of the vessel has to discharge the bills in order to get his vessel back. To avoid the necessity of paying the charterer's bills, vessel owners frequently insert in their charter parties clauses requiring the charterer to provide and pay for all fuel and supplies. This works out to the owner's satisfaction with charterers financially responsible, but, when the latter are not, such a provision is of no avail.

By proper provisions in a charter party an owner may escape responsibility for paying the charterer's bills. Such a provision must expressly declare that the charterer is deprived of any right or power to buy supplies on the credit of the vessel or incur liens against the vessel for such supplies.

This principle is followed by Judge James in the suit just referred to, which was a libel brought by the Associated Oil Company against the Norwegian steamer Golden Gate. The judgment was rendered by Judge James in the Federal District Court, sitting in Los Angeles. Messrs. Derby, Sharp, Quinby & Tweedt, Daniel W. Hone, and Ray Howard represented the libelant and Messrs. Young, Lillick, Olson, Graham and Kelly representing Knut Knutsen, owner of the Golden Gate.

It is expected that an appeal will be taken in this case.

Mixed Cargo

The Pacific Marine Review acknowledges with appreciation a copy of the annual report and chairman's speech delivered at the forty-seventh general meeting of the Institute of London Underwriters, held in London, January 13, 1931. Both the report and the speech delivered by G. A. T. Darby, retiring chairman, reflect the depressed condition of the market for the past year, but sound a note of optimism for the future. G. G. Sharman, underwriter for the World Marine and General Insurance Co., Ltd., and E. L. Jacobs, underwriter for the Alliance Insurance Co., Ltd., were elected Chairman and Deputy Chairman, respectively, of

the Institute for the coming year.

Our readers will remember that the cargo and life losses resulting from the San Juan-S. C. T. Dodd disaster of August, 1929, are being proved before Federal Commissioner Williams in San Francisco to determine their respective shares in a settlement limitation fund of approximately $300,000. After hearing some of the testimony of the dependents regarding the value of the deceased and their personal effects, we suggest that every passenger who boards a seagoing vessel should be required to sign a slip reading somewhat as follows:

1. I am in perfect health and earn the sum of $50,000:
   (a) Annually
   (b) Per week
   (c) When I get it
2. My dependents would suffer/benefit by my death to the extent of $..........................
3. I am carrying in my pockets on this trip the following articles, valued in the amounts shown below:
   (a) Currency $..................
   (b) Jewelry ....
   (c) Heirlooms ....
   (d) Original Rembrandts ....
   (e) Prewar liquor ....
   Total $..................

The members of the Association of Marine Underwriters of San Francisco celebrated in their customary thorough and convivial fashion at the annual banquet held in the Commercial Club on the evening of January 31. The banquet of this year set a new high record for attendance there being 136 earnest eaters at the festive board.

At a business meeting held earlier in the day, the following officers were elected to lead the Association for the year: President, W. L. Dawes; Vice-President, R. A. Mitchell; Secretary-Treasurer, W. J. Jansen.

INLAND MARINE BODY FORMED

The Inland Marine Underwriters' Association, recently organized in New York, has appointed a Pacific Coast advisory committee to handle the association's affairs. The committee consists of W. B. Brandt, chairman (W. B. Brandt & Co.); E. T. King of Rathbone, King & Seeley; A. W. Follansbee of the Fireman's Fund; A. B. Knowles of the St. Paul Fire & Marine; H. J. McCauley of the Insurance Company of North America; J. R. F. Servaes of the Pacific Marine Insurance Agency; and C. W. Jones of the Home of New York. As there are 149 companies holding membership in the association, the work devolving upon the committe will prove extensive. G. Kirkham Smith is secretary-manager for the association on the Pacific Coast.

New and standardized forms have already been issued covering jewelry and floater risks, and it is hoped that concerted action by member companies will correct the wide variation in rates and conditions which has hitherto marked this comparatively new field of insurance.

The Study Class of the Association of Marine Underwriters of San Francisco at its meeting of January 12 was addressed by Captain H. W. Rhodes, U. S. Superintendent of Lighthouses, and by George E. Dane of the law firm of McCutchen, Olney, Mannon & Greene.

Freights, Charters, Sales

February 13, 1931.

THE following steamers have been fixed with grain to U.K./Continent: British str. Wentworth, Vancouver, B.C., to Bordeaux and Hamburg; British str. Nyanza, Vancouver, B.C., to U.K./Continent, 23/9; British str. Trelawney, Columbia River to U.K. Continent, Jan.; British str. King City, Vancouver, B.C., to Greece, 24/3, Jan., L. Dreyfuss and Co.; British m.s. Jedmoor, Vancouver, B.C., to Portugal, Mar., Continental Grain Co.

The Japanese str. Ryoka Maru has been fixed with grain from Vancouver, B.C., to Shanghai, Feb., by Mitsubishi Co.

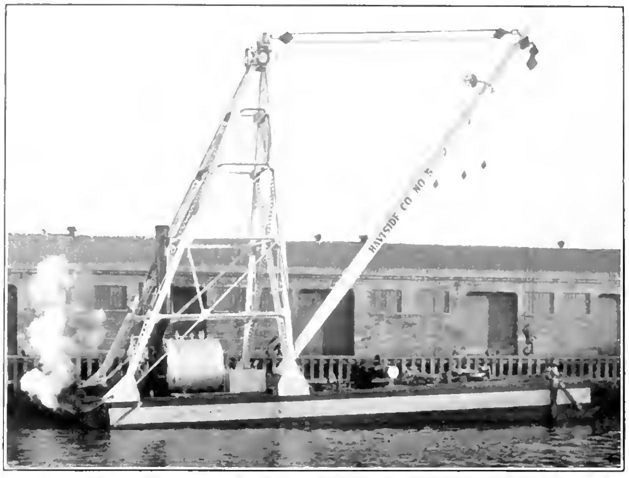
The following steamers have been fixed with lumber to the Orient: French str. L. D. Emilie, Columbia River to Japan, $6.50, Feb., Douglas Fir Exploitation and Export Co.; Japanese str. Seisho Maru, Puget Sound and British Columbia to Yokohama/Moji Range, one port $6.25, two ports $6.50, H. R. MacMillan Export Co.

The following time charters have been reported: Norwegian m.s. Gisla, delivery Philadelphia redelivery North Hatteras via North Pacific, $1; Norwegian m.s. Norne, 2 years, delivery British Columbia redelivery world wide, $1.20, April, Strange & Co.; Norwegian m.s. Childer, delivery North Pacific redelivery U.K./Continent, prompt, W. L. Comyn & Sons; Norwegian m.s. Ravanas, 18 to 24 months, delivery Colon, June, Strange & Co.; Norwegian m.s. Rigel, delivery Colon redelivery North of Hatteras, Feb., Strange & Co.; British m.s. Belray, 1 trip, delivery North Pacific, redelivery U.K./Continent, $1.75, Feb./Mar., Canadian American Shipping Co.; Danish m.s. Columbia, delivery North Pacific, redelivery China, $1.50, Feb., H. R. MacMillan Export Co.; Norwegian m.s. Cornewill, delivery British Columbia redelivery India, April, H. R. MacMillan Export Co.; Norwegian m.s. Fordefjord, 4 to 5 months, delivery North Hatteras redelivery U.K. via North Pacific, 80 cents, H. R. MacMillan Export Co.

The following sales have been reported: Panama m.s. Monterey, United States Marshall to The Moore Dry Dock Co., $1000; American steamers Point San Pedro and Point San Pablo, Swayne and Hoyt to McCormick Steamship Co.

PAGE BROTHERS, Brokers.

The Haviside Derrick and Barge Salvage Fleet



The new derrick barge Haviside No. 5.

GROWTH in commerce at the harbor of San Francisco is continually calling for new and better equipment to take care of special requirements. Larger and faster passenger and cargo liners call for longer and wider piers and naturally for improved facilities for handling special heavy cargo.

The Haviside Company of San Francisco, owner and operator of the greatest fleet of derrick and salvage barges on the Pacific Coast, has always kept its equipment improved and augmented to a point fully abreast of the demands made by this remarkable growth in seaborne commerce.

Holding to its policy, this firm has recently built and equipped to its own special design and specifications a new derrick barge, named Haviside No. 5. The hull for this craft consists of a special Kruse and Banks-built wooden barge, 120 feet long, 46 feet beam, and 12 feet depth. On this hull is erected a steel A-frame 85 feet high, fabricated by The Moore Dry Dock Company. The attachment of this steel frame to the hull is designed to spread the strains uniformly over the wooden structure and provide an ample safety factor under any working position of the barge. The boom, 110 feet in length, was built of hollow steel by the Bethlehem Shipbuilding Corp., Ltd.

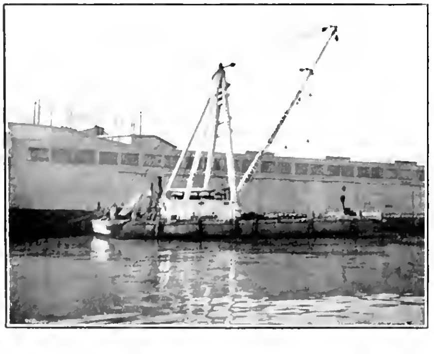
An American Hoist & Derrick Company steam hoisting winch serves the derrick. Steam is supplied from a return tubular, oil-burning boiler installed on the deck of the barge. Fuel oil tanks are built into the hull. The wire cable used was made to order by the American Steel & Wire Company from special plow steel wire laid to Haviside specifications.

All blocks are made to special specifications drawn up by Haviside. All shackles, straps, and other attachments on these blocks are of special heat-treated chrome vanadium steel, as is also the big hook made by the American Forge Co. Sheaves are of special steel and the pins of stainless high carbon steel.

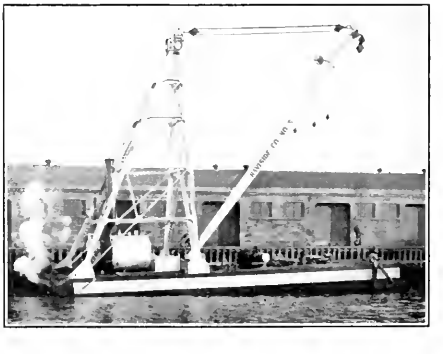
All metal work on the barge is protected from corrosion by Ampcolum, the special aluminum paint manufactured by the American Marine Paint Company.

Haviside No. 5 will easily lift 90 tons and is a very useful addition to the Haviside fleet and to the San Francisco Bay equipment for special lifting and salvage work.

The Haviside Company is certainly to be commended for having the courage to build this new equipment in the present time of depression. This action is characteristic of that faith in San Francisco which has been evidenced by this California firm since the days of the pioneers.



Haviside derrick barges No. 2 and No. 4



Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

CAPTAIN ANDREW G. TOWNSEND, commander of the Matson liner Maui, in February won the Pacific Merchant Skippers' Golf Championship, according to a special dispatch from Honolulu. Captain Townsend defeated CAPTAIN SHUNJI ITO of the N.Y.K. motor liner Tatsuta Maru in a hotly contested match over the beautiful Royal Hawaiian championship layout.

Seems the Pacific master's crown is a mobile affair, for Captain Ito had but recently lifted it from the classic brow of CAPTAIN GEORGE W. YARDLEY of the Dollar liner President Cleveland.

JOHN E. RYAN, general passenger manager of the Matson Line, who chanced to be in Hawaii on business, cabled the news of Captain Townsend's victory, proud that the emblem of supremacy now rests under the Matson House flag. Here's the message: "Captain Townsend invites a challenge from any Pacific ocean merchant skipper who thinks he has mastered the fine points of golf, the championship match to be played in either San Francisco or Honolulu."

Captain Andrew G. Townsend of the Matson liner Maui, one of the Pacific's youngest masters.

Captain Townsend's home is in Alameda, California.

MORE than 100 Propellers inaugurated the new weekly luncheon of the Propeller Club of California, gathering in the California Room of the San Francisco Commercial Club on Tuesday, February 24. President Ralph W. Myers presided.

We were entertained by the presentation of an aerial motion picture entitled "San Francisco and Pacific Trade," this educational film coming before us through courtesy of Ralph W. Myers, Harry Haviside, and Herbert Burns.

Each Tuesday it is planned to have prominent visiting shipping officials with us as guests of honor, with informal discussions on timely marine subjects.

These regular Tuesday luncheon gatherings do not disturb the daily noon-day meetings at 442 Pine Street. Through use of the spacious and comfortable California room at the San Francisco Commercial Club we have ample seating arrangements for more than 100 Propellers and their guests.

Herbert J. Anderson, chairman of the luncheon committee, arranged the Tuesday Propeller luncheons; and in the future we may anticipate some mighty well attended and instructive assemblies. Captain Louie Black of Wilmington, California, was with us at the first Tuesday gathering.

Norman Titus, chairman of the United States Load Line Committee, and H. B. Walker, president of the American Steamship Owners' Association of New York, will address us on or about March 20. Some time in April the world-famous flier, Air Commodore Charles Kingsford-Smith, will be with us and describe his transpacific and world-circling flights. The Air Commodore is a brother of Propeller R. H. K. Smith of the American-Hawaiian Line, San Francisco.

HUGH MACKENZIE, passenger traffic manager for Dollar Steamship Lines, Inc., Ltd., releases this interesting paragraph about the new Dollar liner President Hoover: "Drive your car aboard at point of embarkation, drive it ashore when your ship ties up at your destination will be the custom when the new Dollar liner President Hoover goes into service this summer with a sailing from New York to Manila, via California, Hawaii, Japanese, and Chinese ports. Installation of this ultra-modern aboardship garage is nearing completion at Newport News Shipbuilding and Dry Dock Company where the President Hoover is being made ready for sea. This garage will be conveniently located so that motoring travelers can drive their cars aboard through side ports without difficulty. Close by will be a machine shop, fully equipped for repair and servicing of cars."

CAPTAIN OLE LEE of the steamer Golden Star in the O & O Oriental service of the American-Hawaiian Lines, was recently presented with the United States Naval Reserve flag, the Golden Star being the first vessel in this specific trade to be so honored.

COMMODORE GEORGE W. BAUER, who is the highest ranking commodore in the United States, COMMANDER R. L. REICHMUTH, and LIEUTENANT-COMMANDER W. C. TOOZE, from the 12th Naval

(Continued on Page 21)

Matson's flagship, the Malolo, now has H. T. Keene as chief engineer. He was formerly chief of the Maui.

Official News *of the* PROPELLER CLUB *of* California

Club House and Swimming Pool at Castlewood Country Club.

Third fairway and green

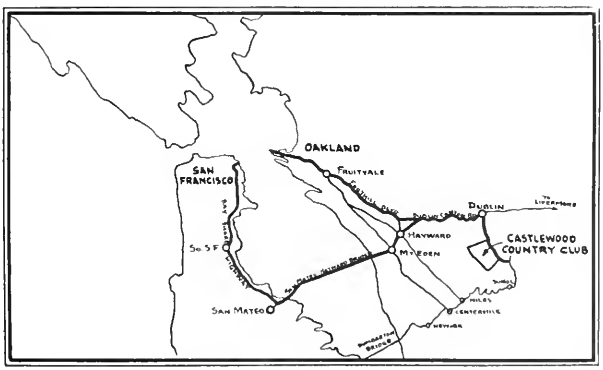
PROPELLERS
to Golf and Dine
CASTLEWOOD
MARCH 12th.

Ninth and eighteenth greens (club house in background)

The beautiful Castlewood Country Club has been selected for the Second Annual Spring Golf Tournament of the Propeller Club. Thursday afternoon, March 12th, is the date and plans are being perfected by the committee to make this a Day of Days for the maritime fraternity of the bay area. It takes about an hour and a quarter to drive to Castlewood from San Francisco via the Bay Shore Highway and San Mateo-Hayward Bridge—and about 50 minutes from Oakland via Foothill Boulevard and Dublin Canyon Road, so plan your time accordingly. An unusually attractive rate has been secured by the committee—$5.00 will cover the cost of golf and dinner. For a day of good fellowship—among the beautiful and historic surroundings of the Pleasanton hills—away from the salt water and fogs of the bay—Come to Castlewood, March 12th—Golf and dine with your fellow Propellers. Rush in the required information and forward your reservation card without delay and mail to Edgar Martin, Secretary, Propeller Golf Club Committee, 1200 Balfour Building, San Francisco. Members desiring to bring guests must notify the Secretary of the Committee in advance. Reservations close Tuesday, March 10th.

COMMITTEE

Russ Pratt, chairman
Eddie Martin, secy.
Bill Empey
Tom Crowley
Cap January
Vern Showell
Dad Le Count
Bert Anderson



Follow the Chart and You Can't go Wrong!

District, presented the warrant to Captain Lee at San Francisco, after which the naval emblem was hoisted to the Golden Star's masthead.

American-Hawaiian officials present at the ceremony were T. G. PLANT, operating manager; N. J. KANE, marine superintendent; BERNARD MILLS, superintending engineer; PORT CAPTAIN F. C. SWICKER, and D. A. McPHERSON.

Officers of the Golden Star are: CAPTAIN OLE LEE, J. E. BLAKE, chief engineer; A. M. PETERSEN, first officer; A. M. EVJENTH, second officer; M. L. MORROW, third officer; E. GRIFFIN, first assistant engineer; and R. H. COLEMAN, second assistant engineer.

J. E. CALWAY, port steward at San Francisco for American - Hawaiian Lines, and with that carrier since 1903, was recently laid up with illness. Calway's many friends are glad to learn that he is recovering and ready for duty again. During his absence T. J. DOWD handled this busy department of supply for the great A-H fleets.

R. ROBERT LIDDELL, a veteran of thirty-two years service at sea and ashore, has been appointed superintending engineer of the Canadian Pacific Steamships, Ltd. of Vancouver, succeeding HARRY BURGESS, who has retired. Going to sea in 1898, Liddell served on various lines until 1908 when he joined the fast growing Canadian Pacific fleet on the Atlantic as junior engineer aboard the old Empress of Ireland. He was on this ship when she was rammed in the St. Lawrence by an oil tanker in 1914 and went to the bottom. He later served on the Empress of Britain and was granted the rank of lieutenant when this ship was assigned to wartime naval duty. As assistant superintending engineer he afterwards served the Canadian Pacific at Glasgow, where he superintended the re-engining of the Empress of Britain, the Empress of Australia, and Empress of Canada. He later was transferred to Hamburg, and in 1924 became superintending engineer successively at Hamburg, Antwerp, Southampton, and Glasgow.

With the new year Captain A. J. Holland became marine superintendent for the Canadian Pacific's fleet of "Empresses" at Vancouver. He was recently staff captain of the 26,000-ton Empress of Japan.

PROPELLER GOLFERS, AHOY!

STRANGE, determined and grim visage of late has come over "Jim" Cronin, chairman of the Propeller Board of Governors. All of which moves us to wonder why and wherefore. Investigation, however, proves that "Jim" is deeply enmeshed in matters of rhythm, timing, weight-shift and the "on-a-line" principle. (He's been carefully avoiding discussion of the handicaps of shipping.) Comes it now—"Jim" is now in his 11th of a series of 12 golf lessons. Has a putting green in his living room, and a few light globes left in the chandelier. Hafta work fast these days with the Propeller Club's Second Annual Spring Championship set to go at Castlewood Country Club on March 12—and a three-foot silver trophy awaiting the winner.

Canadian Pacific Steamships, Ltd.'s new superintending engineer—R. Robert Liddell, a veteran of thirty-two years sea and shore engineering experience.

CAPTAIN A. J. HOLLAND, one of the younger commanders of the Canadian Pacific's white Empress fleet on the Pacific, on January 1 succeeded the veteran CAPTAIN F. L. DAVISON, retired, as marine superintendent at Vancouver. Captain Holland, until his recent appointment, was staff captain on the new 26,000-ton liner Empress of Japan, and has filled many important posts with the Canadian Pacific. For a time during 1930 he relieved Captain A. J. Hosken, R.N.-R., as commander of the Empress of Russia, and has spelled off the commanders of the Empress of Canada and Empress of Asia at other times. For a number of years he acted as superintendent of the company's wharves and terminals at Honk Kong.

New President of McIntosh & Seymour.—A. E. Ballin, for many years president and director of the McIntosh & Seymour Corporation, retired February 1, 1931, and the board of directors of the corporation elected R. B. McColl to fill the position.

Mr. McColl was born in Kilmarnock, Scotland, in 1882. After graduating from the local academy and college he served a special apprenticeship, covering all departments, with the Glasgow and Southwestern Railroad; and then worked as draftsman with Robert Stephenson and Sons, locomotive builders. From 1905 to 1917 he worked in various capacities for the Montreal Locomotive Works, finally becoming Works Manager. In 1917 and until the Armistice he acted as manager of the Munitions Department of the Eddystone Munitions Company. He then returned to England as general manager of Armstrong Whitworth's locomotive department, and, in addition, was made general manager of the Pneumatic Tool and the Gas and Oil Engine Departments and director of the Works Board for all plants of the company.

In January, 1922, Mr. McColl came to the United States; and in June of that year was appointed assistant sales manager of the Schenectady Works of the American Locomotive Company. In 1925 he was appointed manager of that plant and held that position until his present election to be president and works director of the McIntosh & Seymour Corporation.

NORTH PACIFIC COAST LINE

JOINT SERVICE OF

Holland-America Line , , Royal Mail Steam Packet Company

Between
PACIFIC COAST PORTS
AND UNITED
KINGDOM AND
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PORTS

ALL VESSELS
ARE ESPECIALLY
FITTED WITH
REFRIGERATOR
SPACE FOR
CARRYING
PERISHABLES

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120 Market Street HOLLAND-AMERICA LINE San Francisco

DOLLAR STEAMSHIP LINES

EXPRESS FREIGHT-PASSENGER AND REFRIGERATOR SERVICES

Trans-Pacific

WEEKLY SAILINGS from Los Angeles Harbor and San Francisco to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, Manila FORTNIGHTLY to Singapore, Penang, Colombo.

Round-the-World

FORTNIGHTLY SAILINGS between Boston, New York, Havana, Colon, Balboa, Los Angeles Harbor, San Francisco, Honolulu, Kobe, Shanghai, Hongkong, Manila, Singapore, Penang, Colombo, Suez, Port Said, Alexandria, Naples, Genoa, Marseilles, thence New York.

Intercoastal Westbound

FORTNIGHTLY SAILINGS from Boston and New York to Los Angeles Harbor and San Francisco. Transhipment at San Francisco for Oakland, Portland, Seattle and all northern destinations.

Philippine Direct Service

MONTHLY SAILINGS between Los Angeles Harbor, San Francisco, Honolulu, Manila, Singapore.

Trans-Pacific Freight Service

BI-MONTHLY SAILINGS between Los Angeles Harbor, San Francisco, Pearl Harbor, Guam, Manila, Cavite, Iloilo, and other ports as inducement offers.

Dollar Steamship Lines Inc., Ltd.

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LOS ANGELES

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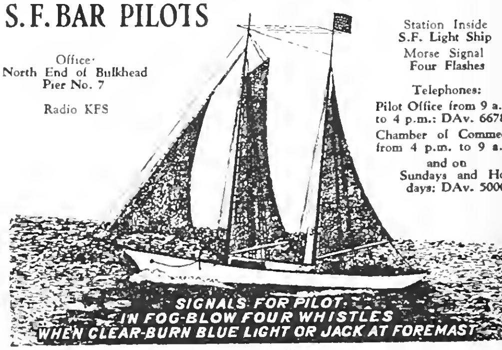
Pilot Office from 9 a.m. to 4 p.m.: DAv. 6678-9
Chamber of Commerce from 4 p.m. to 9 a.m. and on Sundays and Holidays: DAv. 5000.



And Lay Still

When on Station under Sail a White Light is carried at Mast Head.
When under Power, a Red one under White; a Flare or Torch is also burned frequently.

FURNESS LINE

"THE UP-TO-DATE REFRIGERATOR SERVICE."

Express, Freight and Passenger Service

Pacific Coast Ports *to* United Kingdom

FURNESS (Pacific), Ltd.

Pacific Coast Agents

VANCOUVER SEATTLE PORTLAND
SAN FRANCISCO LOS ANGELES

STANLEY E. SEMPLE, general manager in Portland for the Yamashita Shipping Company, is now president of the Portland Steamship Operators Association. GEORGE EGGERS, operating manager for the States Steamship Company, is retiring president. F. N. MILLS, district manager of the American-Hawaiian Steamship Company, is the new vice-president, and ALFRED R. FREY, general agent of the Oregon Pacific Company, is the secretary.

Heading Portland Steamship Operators Association is Stanley E. Semple, Yamashita's Portland manager.

In line with an historical custom established by Lloyd's of London, a bell to be rung only in memory and honor of men lost at sea was installed and dedicated with impressive ceremonies on March 2 in the Marine Exchange of the San Francisco Chamber of Commerce. The famous bell of Lloyd's for ages has tolled its clear note only when a British ship and crew meet with disaster.

To establish a like custom at San Francisco A. S. GUNN, general manager of the Union Plant of Bethlehem Shipbuilding Corp., presented a bell to the Exchange. DEAN J. WILMER GRESHAM of Grace Cathedral presided at the dedicatory program. During the time of the ceremony all operations on the marine and grain floors of the chamber were suspended by arrangement of ABE MARKS, manager.

The first tolling of the bell accompanied the dedication, the clear note sounded in memory of the officers and crew of the steamer South Coast, sunk without trace on the California coast in September of 1930. The second tolling was for the officers and crew of the steamer Brooklyn, which foundered off Eureka, November 8, 1930.

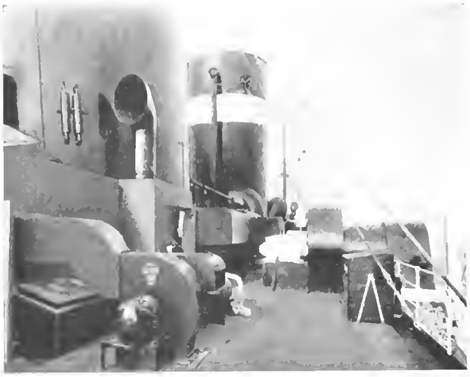
RALPH W. MYERS, vice-president of the Shipowners Association of the Pacific Coast and president of the Propeller Club of California, took part in the ceremony.

As we go to press word is received indicating an improved condition for W. A. "BILL" YOUNG, JR., general passenger manager for the Grace Lines and Panama Mail Line, recently injured in a landslide in Lima, Peru. The news reporting that Young had escaped leg amputation and is on the road to recovery means much to his host of friends in shipping on both the Pacific and Atlantic coasts. Mrs. Young met with death in the accident and first reports despaired of "Bill" Young's life. It is expected that Mrs. Young's body will be sent to San Francisco and burial will be at Petaluma, her mother's home. A son, Howard Young, is a senior at the University of California.

C. A. WARD, chief naval architect for GIBBS & COX of New York, was recently in San Francisco for a conference with EDWARD T. FORD, president, and C. C. MALLORY, general manager, of the Panama Mail Steamship Company, on subject of the four new passenger and freight liners. The keel for the first vessel is to be laid in July at the Federal Shipbuilding and Dry Dock Company, Kearny, New Jersey.

In line with the International System policy of coordinating Mackay Radio service with that of the associated company, Postal Telegraph, the Mackay Radio and Telegraph Company has moved its San Francisco general offices to the fifth and seventh floors of the Postal Telegraph Building, corner of Bush and Battery Streets. Personnel of the marine department on the Pacific Coast is as follows: H. E. COYLE, marine superintendent, San Francisco; C. H. CANNON, inspector and installer of radio telegraph equipment and Kolster radio compass; A. W. SCHNEIDER, radio service; F. L. DEWEY, district manager, Los Angeles; E. H. PRICE, district manager, Portland; and H. R. SANDERSON, district manager, Seattle.

Panama-Pacific's intercoastal liner Pennsylvania has several changes in the officers' staff. CAPTAIN H. A. T. CANDY remains as commander. FRANK FENDER is a new chief officer, returning to sea duty after several years ashore as assistant port captain of the International Mercantile Marine Company in New York. Fender is the son of a '49'er, and went to school in Oakland. He received his early sea training out of San Francisco. During the war he commanded a Shipping Board freighter. JOHN IVERSON, whom Fender succeeded on the Pennsylvania, goes to one of the Roosevelt line ships in the East Indies trade as chief officer. JOHN MOCKRISH remains as first officer on the Pennsylvania, while JAMES LEE is second, having been transferred from the California. CHARLES TRAVERS, who has been with the ship since her first voyage, is third officer.



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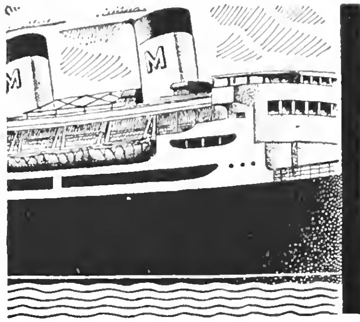

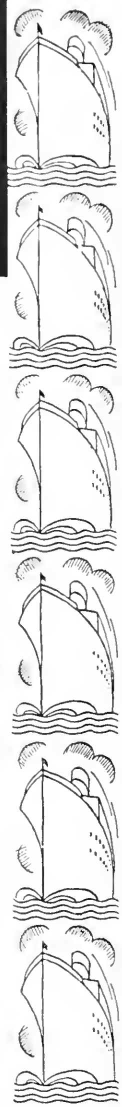

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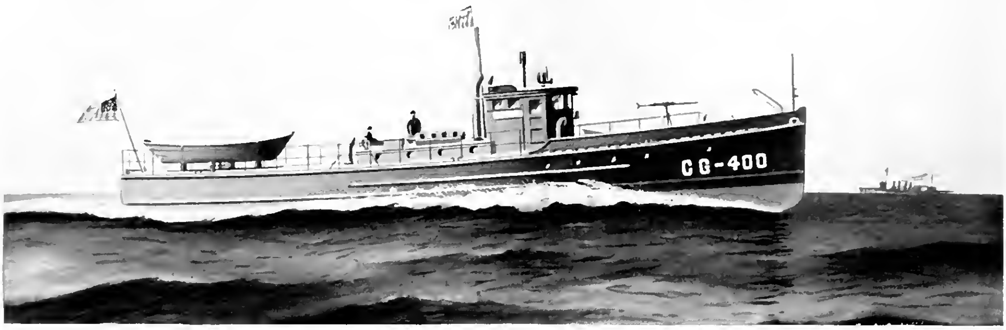
Pacific Marine Review

APRIL 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

FOUR SIZES OF STERLING ENGINES



The 78' Coast Guard patrol boats designed by Eldredge & McInnis, building at the Southern Shipyard Speed 25 M P H, powered with twin Sterling Viking II straight eights, 565 H P each, 1200 R P M the most powerful high duty engines built

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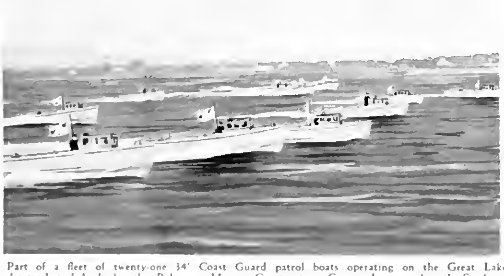

Part of a fleet of twenty-one 34' Coast Guard patrol boats operating on the Great Lakes Speed 31.5 M P H, designed and built by the Robinson Marine Construction Co, and powered with Sterling Dolphin 6 cylinder 300 H.P. engines, 5¼" bore, 6¼" stroke

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | APRIL, 1931 | NUMBER 4

Contents

Official Organ
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James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

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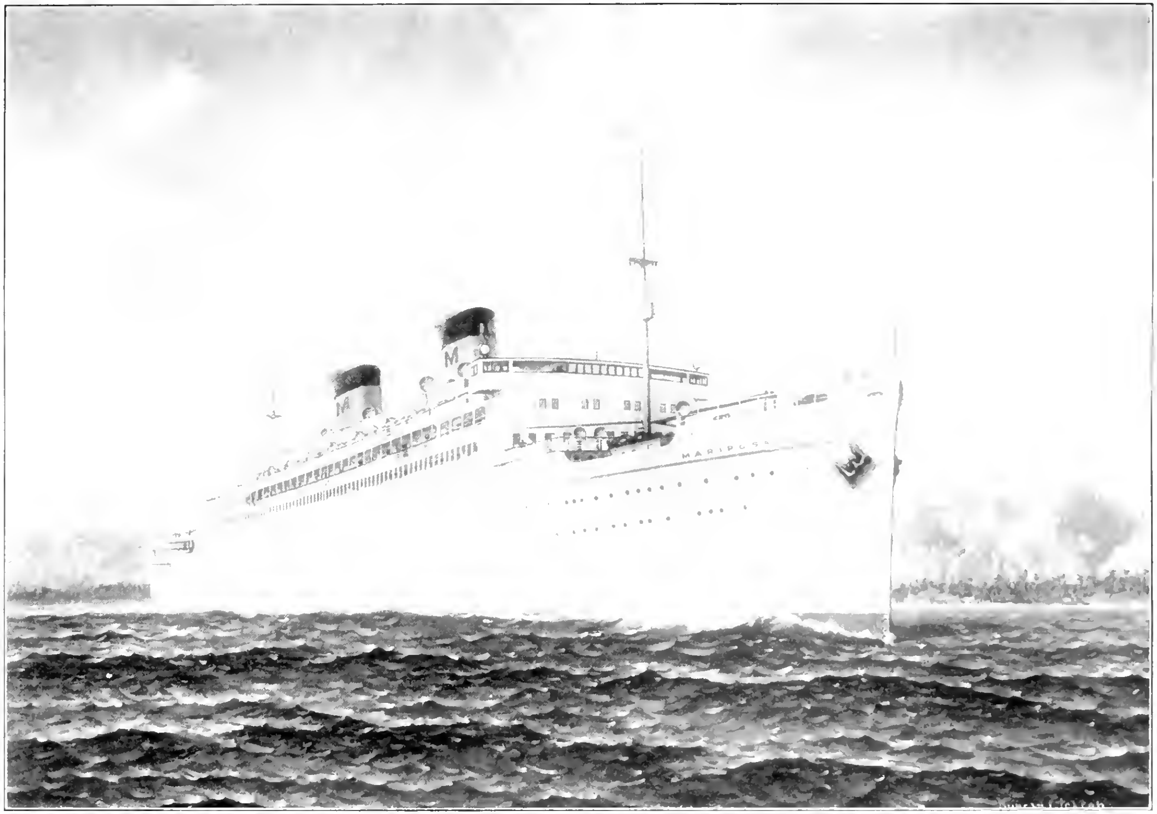
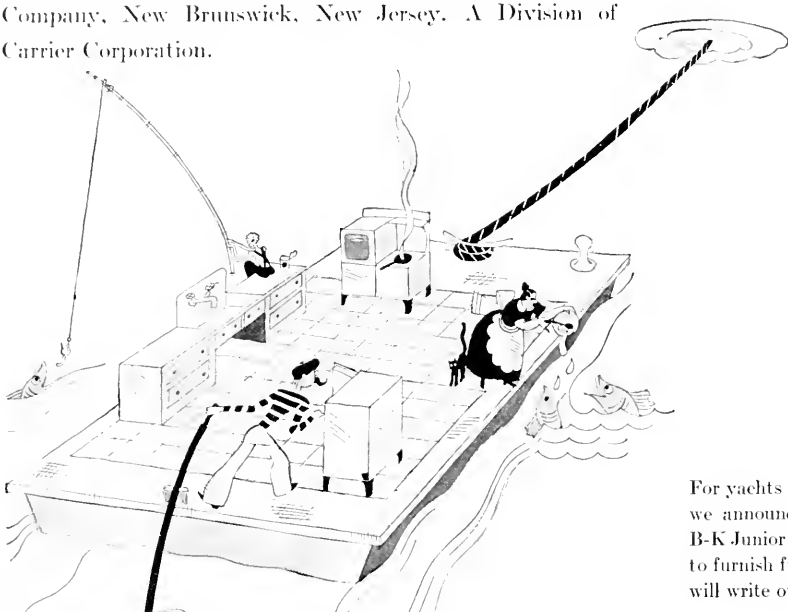
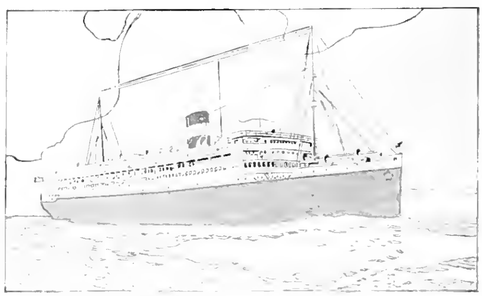


An Artist's Conception of the Matson-Oceanic Line's New White Queen of the South Pacific, the S.S. Mariposa





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Pacific Marine Review

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Editorial Comment » » »

Shipbuilding for Pacific Coast Owners

OUR lead editorial in the March issue dealt with Pacific Coast shipbuilding, recording the fact that no ships building under the Jones-White Act had been contracted for by Pacific Coast shipyards and advocating some remedies for that situation. We now emphasize the corollary fact that a very large proportion of the shipbuilding program now contracted for in Atlantic Coast yards is being built by shipowning corporations whose headquarters and operating bases are on the Pacific Coast.

The Department of Commerce figures for "steel self-propelled vessels, each of 1000 gross tons or over, under construction in American shipyards for private owners as of February 1, 1931," show a total of 27 vessels, aggregating 341,972 gross tons. This includes five tankers of 9000 gross tons each, the balance, or 22 vessels, of 296,972 gross tons being combination passenger and cargo vessels. Of these combination carriers six vessels, with a total tonnage of 118,200 gross, are owned by Pacific Coast operators, and 7 vessels, with a total tonnage of 66,500 gross, are for Pacific trade routes with operating headquarters at Pacific Coast ports. This makes a grand total of 13 vessels and 184,700 gross tons as the Pacific Coast's share in the present American Shipbuilding Program.

In detail we have:

Matson-Oceanic Line—3 ships with a total tonnage of 52,500 gross.

Dollar Line—3 ships with a total tonnage of 65,700 gross.

United Mail Steamship Co. (United Fruit Co.)—3 ships with a total tonnage of 22,500 gross

Panama Mail Line—4 ships with a total tonnage of 44,000 gross.

This indicates that Pacific Coast commerce and Pacific Coast shipowners must be credited with 59 per cent. of the number of vessels and 62 per cent. of the tonnage comprising the present program.

A very significant phase of the Pacific Coast portion of this shipbuilding program, and one that should be especially noted by students of maritime progress, is indicated by the fact that the Pacific American shipowners and operators who have undertaken to build these vessels (a program aggregating more than seventy million dollars) are rated among the oldest, most experienced, and most adequately financed of American firms in the shipping business.

The program outlined is already financed and the vessels under construction. There is on paper an additional program of projected shipbuilding for Pacific Coast owners that will increase this aggregate by at least 50 per cent. and may increase it by more than 100 per cent.

It is also worthy of note that with a large proportion of the fast freight liner tonnage built in Europe during the past five years, the reason for building has been predicated wholly, or in part, on Pacific Coast commerce. All of this activity is just another indication that the Pacific Coast of the United States and of Canada is a rich commercial region with an enterprising population, and a vast wealth of potential and developed natural resources capable of furnishing tremendous aggregate tonnage for cargoes and of absorbing tremendous quantities of raw materials and manufactured goods.

Keep your eye on the Pacific Coast, not only for the solace of that organ with visions of natural beauty, in variety and quality unexcelled on the face of the globe, but also in a commercial and especially a maritime sense for participation in the greatest expansion of overseas commerce that this old world has ever witnessed.

"In the Pacific lies the future center of the world's commercial development."
—Robert Dollar.

Eighty-Seven Years Young

A UNIQUE personality in the Shipping World is the "Dean of American Shipping"—Robert Dollar, chairman of the Board of Directors of the Dollar Steamship Lines, who is now entering his 88th year and is as active as many of his associates of half that age.

Every day, promptly at 8:35 a.m., Captain Dollar arrives at the Robert Dollar Building, San Francisco,

Captain Robert Dollar.

and proceeds to his office on the tenth floor overlooking the harbor. Every day promptly at 3 o'clock his secretary reminds him that it is time to go home.

Born in Falkirk, Scotland, in 1844, Robert Dollar came to America at the age of 13 and took work as a cook's boy in a Canadian logging camp. At 21 he was boss foreman of a lumber camp. A few years later he entered the lumber business for himself and promptly went broke. Deciding that he needed a partner, he married Miss Margaret Proudfoot, who has been his faithful companion for fifty-seven years and has been responsible in no small measure for much of his success.

Captain Dollar was nearly sixty when he first entered the ship operating game and over eighty when he entered the keen international competition of the Round-the-World passenger and cargo liner services. Hard work, keen vision, shrewd common sense have won for Robert Dollar the esteem of his friends and the respect of his competitors. His life is an inspiration to all ambitious young men. His pithy advice to all youth is: "In the Pacific lies the future center of the world's commercial development; so take heart young people, there is no end to what you can accomplish if you dig in."

The family of Captain and Mrs. Dollar consists of R. Stanley Dollar, president of the Dollar Lines, J. Harold Dollar, vice-president of the Dollar Lines, and A. Melville Dollar, who has his own shipping organization in British Columbia, their families, and relatives. They are all considered part of the "family" and the San Rafael home is always the scene of family gatherings on holidays and week-ends.

Another "family," of which there are more than 10,000 members, is the big Dollar-Line-family, which extends to the four corners of the earth, and the Seven Seas. It is with pride that Captain Robert Dollar calls his organization his "family."

"Seest thou a man diligent in his business, he shall stand before Kings."

More Naval Keels for Mare Island Ways

WITH the cruiser Chicago holding her trials and the big submarine out of the way, the management of Mare Island Navy Yard is naturally urging Washington to allocate more naval construction to its ways.

This great plant on San Francisco Bay is excellently equipped and well organized to take care of all classes of naval construction and repair, both in hull and machinery. It is no secret that in recent years Mare Island construction costs have been substantially lower than those at eastern navy yards. Their standard of workmanship is acknowledged to be unexcelled by that of any yard.

Lower construction costs at Mare Island are due not only to the able management of the official personnel at the yard, but also to the lack of new construction in California shipyards, which has made the employment of ship fitters and skilled marine mechanics so casual that a large proportion of the best and most skilled tradesmen have gone to the navy yard, attracted by steady work and the privileges of government service.

These two factors, together with the invigorating year-round climate of the San Francisco Bay region, make an ideal situation for efficient shipbuilding. All the political forces of California should get solidly back of the effort to have Congress and the Navy Department allocate more new naval construction to Mare Island.

To increase local payrolls, while reducing national costs, is certainly good business.

Green Lights on Buoys

AN example of automobile traffic on shore causing confusion in the navigation of vessels, and the solution of the problem, is found in the announcement that green lights are being placed on certain harbor buoys in the Hawaiian Islands. According to the Lighthouse Service of the Department of Commerce, new lighted buoys are being established in Kahului Harbor, Island of Maui, and are equipped with flashing green lights. The green lights are easily distinguished from the red and white lights on automobiles passing along the near-by government road.

Flashing green lights are coming into more general use in the Lighthouse Service as they provide a distinctive color additional to the red and white lights most frequently seen. The new buoys in Hawaii will burn highly compressed acetylene gas, and will burn for long periods without attention.

Eternal vigilance on ship and on shore is the price of safe navigation.

California School Ship

A Chronological Log Showing the Progress to Date in Developing the California State Nautical School

J. C. Rohlfs.

J. C. Rohlfs, manager of the Marine Department of the Standard Oil Company (Calif.) and chairman of the California State Nautical School Board, speaking at the Nautical School luncheon of the Propeller Club reported the progress of the school ship to date in the form of the following chronological log.

May 22, 1930. Steamship Henry County delivered by Shipping Board to Navy at Norfolk Navy Yard to undergo outfitting and some alterations to make the vessel ready for its trip to the Pacific Coast.

July 12, 1930. Partial repairs completed at Norfolk Navy Yard and vessel sailed with cargo of naval supplies for delivery to San Pedro and Mare Island Navy Yard.

August 18, 1930. Vessel arrived at Mare Island Navy Yard to undergo general inspection and survey by Navy Department and be decommissioned.

September 8, 1930. Board of Inspection and Survey report submitted by local board to Navy Department at Washington. They estimated sum of $244,360 necessary to repair and rebuild interior of vessel. This work necessary inasmuch as vessel was built as a cargo ship and therefore had no accommodations for cadets or suitable arrangements for schoolship purposes.

October 2, 1930. Board of Governors wrote Secretary of Navy requesting that Navy approve expenditure of funds necessary for completion of work as set forth in plans and specifications approved by local Board of Inspection and Survey.

October 18, 1930. Secretary of Navy advised that although they approved work as recommended no money was available to carry out same.

October 29, 1930. J. C. Rohlfs, while in Washington, made contact with naval authorities in touch with schoolship situation and was again advised that no money was available to do any work on the schoolship due to the fact that the President had issued a direct order to the Navy Department to economize. He also talked to members of the Navy Department and U. S. Shipping Board relative to securing California City as a shore base for the California Schoolship, which idea was favorably received by the aforementioned parties. They later advised that they were waiting recommendations from Admiral W. C. Cole of the 12th Naval District prior to granting the State a license for the use of said property and equipment. Arrangements were made with the Naval Appropriation Committee to include the sum of $200,000 for the California Nautical School in order to satisfactorily fit the ship for active commission.

November 5, 1930. Rohlfs, on his return, contacted the San Francisco Chamber of Commerce who sent telegrams to the California Delegation at Washington, D. C., urging them to give their active support by wiring the Secretary of the Navy, requesting him to approve the expenditure of sufficient funds to place the schoolship in immediate operation. The Los Angeles Chamber of Commerce also gave its support and urged representatives at Washington to use their best efforts.

January 13, 1931. General information and entrance applications mailed out to applicants to California Nautical School.

January 29, 1931. Entrance examinations held throughout state, over one hundred boys taking the test.

February 10, 1931. California City turned over to State of California by Navy Department under temporary license agreement, thereby providing an admirable shore base for schoolship purposes. Has healthy climate, accessible to San Francisco, 50 acres of ground, water (both salt and fresh), gasoline and oil storage, rigging loft, splicing tools, complete machine, blacksmith, forge, boiler, and foundry shops, electric light plant, wharf in good condition, necessary buildings for housing cadets and shore staff.

February 12, 1931. House of Representatives approved $235,000 appropriation for California Schoolship including annual $25,000 reimbursement to State.

February 28, 1931. Senate approved $235,000 schoolship appropriation.

February 28, 1931. President signed Naval Appropriation Bill. Inasmuch as these funds will not be available until July 1st of this year no work can be undertaken until that time. It is thought that all necessary work on the schoolship will be completed (if started July 1) so that the ship can take its first cruise in October.

In the meantime the California State Nautical School is in session at its shore base with a competent and able staff or faculty and 56 cadets who are busily engaged in absorbing the theoretical aspects of navigation and marine engineering in preparation for their first practical cruise this fall. California is now definitely launched on her school ship career with a fine shore base actually operating and a modern up-to-date school ship in the offing.

Maritime

Legislation Passed and Pending

By George H. Manning

DESPITE the shortness of the last session of Congress and the large amount of highly important legislation which was considered, the legislative branch of the government managed to devote some of its attention to measures affecting the merchant marine.

Congress passed finally two bills of this character: the construction loan interest bill, introduced by Representative Arthur M. Free of California, and backed by the Hoover Administration; and the bill, introduced by Representative David Hogg of Indiana, also approved by the Administration. Passage of both these measures was predicted in the December issue of Pacific Marine Review.

The Free Bill

As finally passed, the Free bill amends section 11, subsection (d) of the Merchant Marine Act of 1920 to provide that "during any period in which the vessel is operated exclusivelyin coastwise trade,or is inactive, the rate of interest shall be as fixed by the board, but not less than 5¼ per centum per annum."

It further provides that "during the period in which a vessel is being constructed, equipped, reconditioned, remodeled, or improved and/or during any period in which such a vessel is operated in foreign trade, the rate shall be as fixed by the board, but provided, however, that on all contracts hereinafter entered into, the interest rate shall be not less than 3½ per centum per annum. The lowest rate of interest shall not be granted for the construction, equipment, reconditioning, remodeling, or improvement of any vessel for the foreign trade unless it is contracted that such vessel upon completion shall not be operated exclusively and under enrollment in the coastwise and/or intercoastal trade for more than three months in any calendar year; and, if such vessel shall be operated exclusively and under enrollment in such trades for more than three months in any calendar year, the board shall collect the difference between the low rate of interest charged and 5¼ per centum per annum during the period of construction, equipment, reconditioning, remodeling or improvement."

In addition, the Shipping Board is given authority to prescribe rules for determining the amount of interest payable under provisions of the new law.

The Hogg Bill

The Hogg bill simply clothes the Postmaster General with authority to "impose or remit fines on contractors or carriers transporting the mails by air or water on routes extending beyond the borders of the United States for any unreasonable or unnecessary delay to such mails and for other delinquencies in the transportation of the mails."

Pending Bills

Senator LaFollette's bill concerning the payment of advance wages and allotments to seamen on foreign vessels (S. 314), passed the Senate February 26, 1931, and was referred to the House Committee on Merchant Marine and Fisheries. No action was taken there, however, and the bill died in that committee.

The bill of Senator King of Utah, providing for the deportation of alien seamen (S. 202), was favorably reported to the House from the Committee on Immigration and Naturalization, after it had passed the Senate. However, no action was taken in the House. Representative Free submitted a dissenting report contending that the bill was rushed through in the closing days of Congress without an opportunity having been given to interests vitally concerned to be heard. Mr. Free said the bill would not close the door to seamen who remain in the United States unlawfully, but that it would permit ineligibles to come in on vessels of their own country just as they do at present.

Hearings were held by the House Committee on Merchant Marine and Fisheries on three bills introduced by Representative Wallace H. White, Jr., of Maine (now Senator White) extending the authority of consular officers. No action was taken by the committee on these measures, the hearings being held merely to get testimony from a State Department official who had been ordered to a foreign country for duty.

Dead Bills

A great many bills died with the last session without having any action on them of any kind. Among these are:

A bill by Representative Ewin L. Davis of Tennessee, permitting the Postmaster General to award mail contracts to citizens of the United States to carry mail between ports between which it is lawful for a vessel not documented under the laws of the United States to carry merchandise. Bills of Senator Hiram Johnson of California and Representative White establishing load lines for vessels in the coastwise and Great Lakes Trade. Senator Wesley L. Jones' bill codifying all laws relating to merchant marine and shipping.

A bill by Senator Duncan U. Fletcher of Florida, limiting the liability of ship owners for loss or damage to goods. Senator George W. Norris' bill setting up standards of safety for maintenance and operation of tackle and equipment used in loading and unloading vessels. Another LaFollette bill and a similar bill by Representative Richard J. Welch of California, relating to the shipping and discharge of seamen. A bill fixing responsibilities of carriers by sea, sponsored by Representative White.

A bill of Representative Noble J. Johnson of Indiana, providing refunds to policyholders of insurance policies issued to masters, officers, and crews of vessels during the World War from the premiums collected by the United States but not used in the payment of claims for losses under the policies. Representative Dyer's bill setting up a travel division in the Department of Commerce. Resolutions offered by Senator Frederick H. Gillett (now retired) and Representative Robert Luce of Massachusetts, directing a joint investigation by the Interstate Commerce Commission and the Shipping Board into equalization of rail and ocean rates on export and import traffic.

A Significant Keel Laying

Jones-White Act Attracting to American Shipyards Work that Formerly Went to European Builders

AT the Newport News Shipbuilding and Dry Dock Company's yard in Newport News, Virginia, the keel was recently laid for the first of three steamships being built for the United Mail Steamship Company, a subsidiary of the United Fruit Co. This is another instance of the beneficent effect on the domestic shipbuilding and shipowning industries of the Merchant Marine Act, 1928, and the more liberal policy of the government in the matter of mail contracts. Since the passage of this law, a number of passenger and freight steamships of good size and speed have been built, but in the majority of cases these were additions to wholly American-built fleets. The significance of this keel-laying lies in the fact that it represents practically the first American-built addition to the largest fleet of fruit carriers in the world and the first of six sister ships, three of which are being built in Newport News. Heretofore, all new vessels for The Great White Fleet, as it is popularly known, have been built in European yards.

In beam, depth, and speed the new vessels will exceed all other vessels of the fleet, and only two of the latter are longer. Their dimensions will be about 447 feet length over-all, 430 feet length on waterline, 60 feet beam, and 34 feet 9 inches depth to upper deck. The gross tonnage will be about 7200, and the displacement at a draft of 24 feet 6 inches will be about 11,000 tons. It is expected that at normal service draft the vessels will have a speed of about 18 knots. They will have a net bin capacity of 180,000 cubic feet for bananas, fuel oil capacity of 1400 tons, and fresh water capacity of 600 tons.

The vessels will be twin screw, with four decks to the hull, a combined forecastle and bridge, and a poop. Eight water-tight bulkheads, all extending to the upper deck or above, will divide the vessels into nine compartments, the subdivision being in execess of the requirements of the International Conference on Safety of Life at Sea and making them "two compartment" vessels, able to keep afloat with any two compartments flooded. Other structural features will be a duct keel extending from No. 1 hold to the boiler room and the fitting of the main fuel tanks entirely clear of the shell and of the cargo holds in order to obviate the possibility of oil leaks through the hull or into the cargo space.

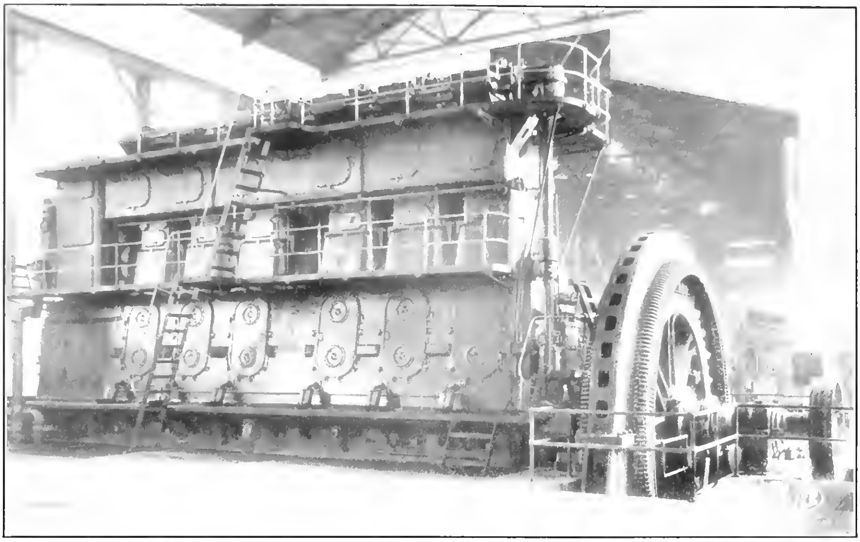
Fruit carrying, particularly bananas, is to be the principal occupation of the vessels. All available cargo spaces will, therefore, be completely insulated and an elaborate refrigerating plant will be fitted in a separate compartment aft of the engine room to provide the necessary brine circulation through the air coolers which will be fitted in eleven of the fourteen fruit-carrying compartments. Motor-driven fans will be fitted in connection with the air coolers to circulate cold air through ducts carried all around each compartment. The refrigerating plant will be capable of maintaining a fruit temperature of 53 degrees Fahrenheit and reducing the temperature of a full cargo of bananas from 86 degrees Fahrenheit to 53 degrees Fahrenheit in approximately twenty-eight hours, under tropical conditions.

Accommodations for about 100 first class passengers will be provided on the upper, bridge, and promenade decks. These will comprise four suites with sitting room, twin-bed room, and private bath, twelve twin-bed rooms with private or connected bath, nine single rooms with private shower and toilet, and regular staterooms with one or two beds. Public spaces will comprise a library and writing room, entrance lobby, lounge, smoking room, and an enclosed deck ballroom, all on the promenade deck. The main entrance lobby will be located on the bridge deck and the dining saloon, with a seating capacity for 108 persons, will be located forward on the upper deck. A special feature will be a permanent out-door swimming pool at the after end of the bridge deck; and there will be a glass enclosed promenade forward on the promenade deck. It will be seen, therefore, that the comfort and welfare of the passengers are being carefully catered to and that the well known high standard of The Great White Fleet will be amply upheld. The accommodations will be thoroughly modern and first class in every respect.

In line with their other up-to-date features, the vessels will have propulsive machinery of the most modern type. This will be turbo-electric, with two main turbo-generators and two propulsion motors, one for each of the two shafts, and four oil-burning Babcock and Wilcox water-tube boilers. The main turbines, generators, and motors are being built by the General Electric Co. and will be capable of developing 10,500 shaft horsepower. The boilers will have a working pressure of 350 pounds and will be fitted with superheaters for about 230 degrees Fahrenheit superheat.

Electricity will play an important part in the operation of the vessels. In addition to the main engines, many of the engine-room auxiliaries will be motor-driven; also the refrigerating machinery, ventilation fans, windlass, capstans, and winches. The steering gear will be hydro-electric. The range and many of the cooking utensils in the galley will also be electric.

These vessels are being built under special survey of the American Bureau of Shipping for classification with them. The design has also been approved by the Navy Department in conjunction with the Shipping Board whose loan fund has made their building possible. In order to make them eligible for participation in the loan fund, all applicable requirements of the International Convention will be complied with and provision will be made for the future installation of guns so that they may be available for service as auxiliaries in case of emergency. The contracts call for delivery of the first vessel in January, 1932, the second in April and the third in July. It is expected that all three vessels will be launched before the end of this year.



Air injection, 6-cylinder, 4000-brake horsepower, Busch-Sulzer diesel. One of two installed in the Tucson power station.

New Development in an American Diesel

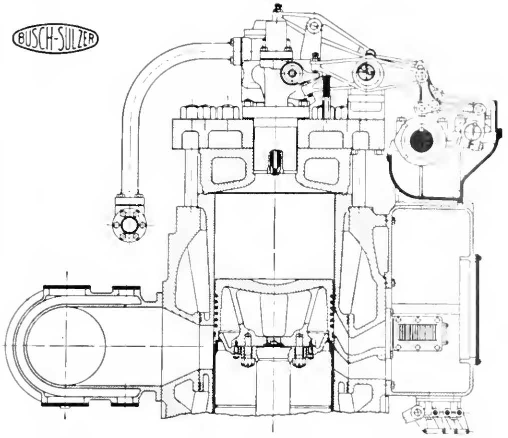
Remarkable Improvement in Specific Volume and Weight for Heavy Duty, Medium Speed, Conservatively Designed, Diesel Engine

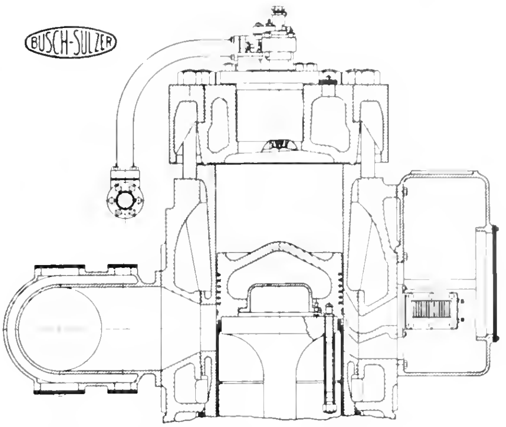
BUSCH-SULZER Bros.-Diesel Engine Co. is now building, on orders, several 2-cycle, single-acting engines incorporating the A.E.G.-Hesselman System of mechanical injection and novel Busch-Sulzer features of design. Among these engines, the most interesting are a 3000 brake horsepower unit and a 4000 brake horsepower unit. The latter is a duplicate of two Busch-Sulzer 6-cylinder, air-injection engines that have been in operation for some time in the Tucson, Arizona, power plant of the Federal Light & Traction Co., excepting that it has been modified by the substitution of Hesselman mechanical injection and an improved type of forged steel piston designed to avoid stuffing boxes and packing rings for the water-cooling spaces. In the upper portions of the cylinders and pistons of both the air-injection and the mechanical-injection engine much simplification has been accomplished. The cylinders are 30 inches bore, which is believed to be the largest diameter so far built, commercially, with mechanical injection. The stroke is 42 inches.

This company, like all other diesel engine builders in the United States (excepting only one that is also a shipbuilder), has not on its books a single order for a large marine engine; but, desiring to establish the merits of a marine engine of this type, it is fitting this 4000 brake horsepower engine with reversing gear, and will demonstrate this in its shops, under full load; thereafter stripping off the reversing gear before shipping the engine for stationary installation in the same Tucson plant.

The 3000 brake horsepower mechanical-injection engine is being built for the Village of Freeport, New York, in whose power station there are already in operation 5665 brake horsepower in Busch-Sulzer air-injection diesels. The design of this new trunk-piston engine enables the installation of 3000 brake horsepower in the space that was originally intended to accommodate an additional 1500 brake horsepower Busch-Sulzer cross-head type engine, without increase in dismantling height. Excepting in size, frame construction, and system of fuel injection, this new engine follows closely the long established Busch-Sulzer smaller type E, 2-cycle, air-injection, trunk-piston engines, which have a rated capacity of 165 brake horsepower per cylinder at 277 revolutions per minute.

Although not designed with special effort to reduce weight, this 3000 horsepower engine, including its scavenging blower, will weigh substantially under 100 pounds per net brake horsepower. It is intended for services such as diesel-geared and diesel-electric ship





At left, a cross-section of the upper end of cylinder of the standard 2-cycle Busch-Sulzer air-injection diesel engine. At right, a cross-section of the upper end of the cylinder of the new 2-cycle, airless-injection Busch-Sulzer diesel engine.

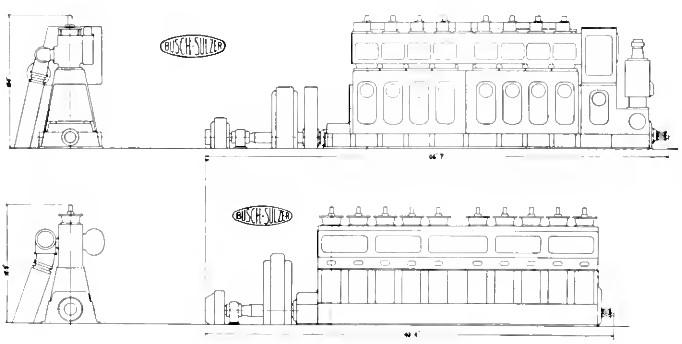
propulsion, as well as for stationary installations and direct-connection to propeller shafts. Utmost simplicity and accessibility, as well as low head-room, are combined to produce an engine that, in these respects, will be more attractive than double-acting engines of medium and small capacity. The company contemplates extending this design to larger capacities, up to about 600 brake horsepower per cylinder, especially suitable for services and locations in which low head-room is of importance; as, for example, in cruisers.

The engine for Freeport is a 10-cylinder, 2-cycle, trunk-piston, separately scavenged unit, with cylinders $19\frac{1}{2}$ inches bore by 27 inch stroke and it is rated 3300 gross brake horsepower at 240 revolutions per minute; or 3000 net brake horsepower, after deduction of the power consumed by the scavenging blower and pumps. Several novel features are incorporated, a number of which have been patented by Busch-Sulzer or are the subjects of pending patent applications.

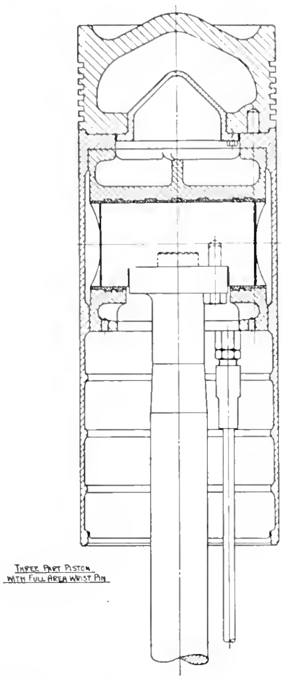
The bedplate and cylinder block are each in two lengths. The intermediate frames are of modified "A" frame design. Tie rods from the top of the cylinder block to the underside of the bearing bridges in the bedplate bind the structure into a rigid unit. The arrangement of the doors or covers of the frame, following A.E.G., make a light and convenient assembly. The doors or covers are of steel plate, made tight at their tops and sides by return angles resting against soft packing strips in grooves cast into the frame. The bottom edges of the doors rest against the interior sides of upwardly projecting flanges along the top of the bedplate; which flanges are machined on their interior faces and serve also to locate the intermediate frames and hold them rigidly in the transverse direction.

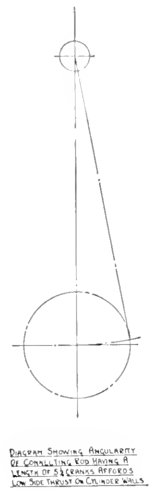
Scavenging is according to the Sulzer system, with Busch-Sulzer automatic blade valves controlling the upper tier of ports; the ports being modified on the lines developed by the A. E. G. The scavenging air for this type of engine may be furnished by an attached pump or by an independent blower.

The construction of the piston and connecting-rod is interesting and follows regular Busch-Sulzer Type E engine design. The cylindrical surface of the piston-skirt is not punctured by holes for the wristpin; and the entire skirt is a plain symmetrical body without heavy bosses such as are required for the usual method of mounting the wristpin in the piston. The wristpin, of case-hardened steel, is attached to the connecting-rod and takes its bearing in an internal housing over the whole length of the upper half of the pin, the unit bearing pressure being about one-half of that

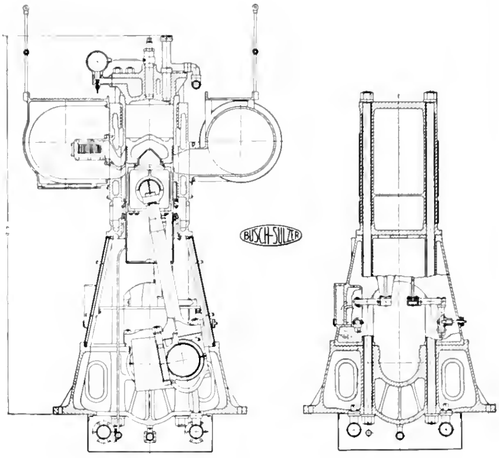


The diagrammatic sketch shows to the same scale (above) a 1500-brake horsepower, 180 R.P.M., single-acting, 2-cycle, cross-head type, air-injection diesel with compressor and scavenging pump integral. Floor space 490 square feet; height to remove pistons 17 feet 3 inches, engine weight 175 pounds per horsepower. (Below) 3000-brake horsepower, 240 R.P.M., single-acting, 2-cycle, trunk piston type, with airless injection and separate turbo-blower. Floor space 520 square feet; height 18 feet 6 inches; weight under 100 pounds per horsepower.





Section through piston showing the special piston, the construction of upper end of connecting rod, and design of piston pin.



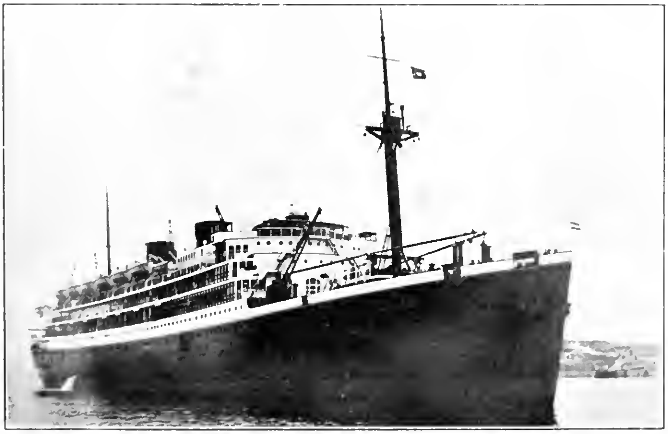
End elevation and transverse sections through new type Busch-Sulzer airless injection diesel.

usually obtained with the conventional construction. The wear of this bearing, which is pressure-lubricated, is substantially nil. The absence of holes through the wall of the skirt also avoids leakage of lubricating oil to the outside of the skirt, which leakage occurs in the ordinary construction, no matter how tightly the wristpin is fitted in the bosses.

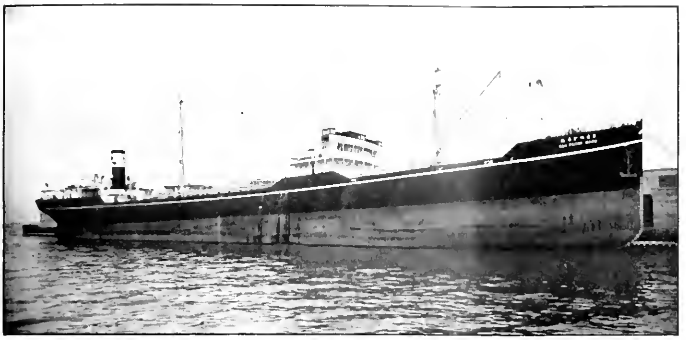
The piston-head is oil-cooled, the circulation of oil being such that, after months of operation of similar Busch-Sulzer type E engines, only a bare trace of carbon is found on the inside top surface. Lubricating oil, from the same system as the pressure lubrication, is used for piston-cooling. It is not discharged into the bedplate, but is carried out of the engine to the sump tank in a closed system, suitably vented, through discharge chambers in the frames, where its flow and temperature may be observed.

Between the bottom end of the cylinder liner proper and the interior of the crank-case is a so-called "sludge chamber," through which the piston passes. This chamber is provided with wiper rings above and below, and is open to the atmosphere. The upper wiper ring strips off the lubricating oil that is carried down by the piston, and the lower wiper ring strips off that which is carried up from the crankcase. There is no possibility of gases or flame from the cylinder entering the crankcase, or lubricating oil from the crankcase passing up into the cylinder, and the piston is visible from the outside, so that its condition and lubrication may be observed at all times.

The fuel injection system and combustion chambers are of the A. E. G.-Hesselman type. There is a separ-



Many splendid motorships attest the reliability of Sulzer marine diesel engines. Our illustration shows the Dutch motor passenger liner Johan van Oldenbarnevelt. She is engined with two 7500-horsepower Sulzer diesels and is giving a very good account of herself on the Dutch East Indies run.



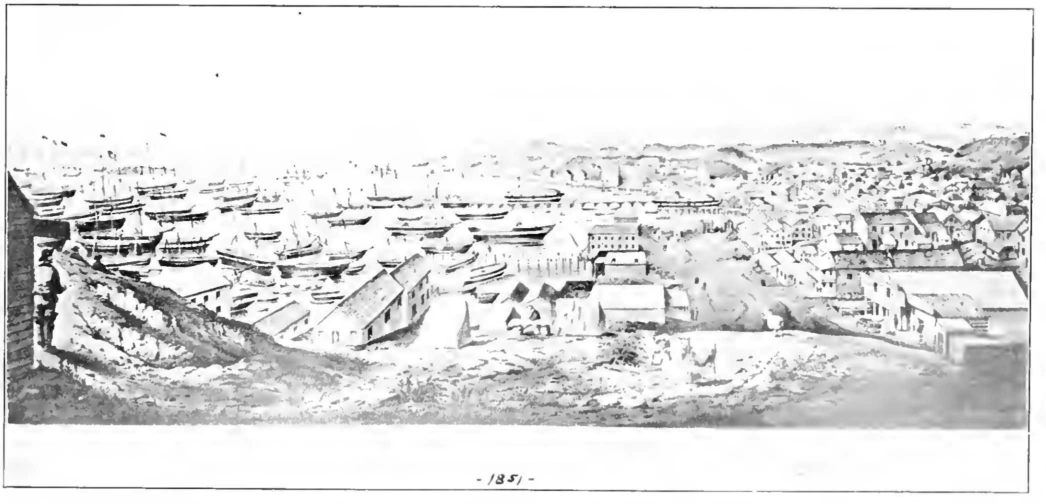
The Japanese motor tanker San Pedro Maru. This vessel is one of several recently built and engined by Mitsui and Company with Sulzer diesels.

ate fuel pump for each cylinder, all pumps being combined in a common housing, with a single drive. The fuel lead is constant for all loads; the quantity is regulated by the governor control of the point of opening of the spill valve. The arrangement of the fuel pump and control mechanism is such that the engine may be made directly reversible by the addition of astern cams and a few simple parts, the starting, stopping, reversing, and fuel-control being performed by means of a single-handwheel. A 900 brake horsepower 6-cylinder reversing engine of this same type is now nearly ready for tests in this company's works.

In connection with its adoption of the Hesselman system of mechanical injection, this company, early last year, built a small experimental 2-cycle engine with two cylinders, 11 inches by 16 inches, fitted with the Busch-Sulzer arrangement of cycloidal-impeller scavenging blower, and rated 200 brake horsepower at 500 revolutions per minute. The purpose of the experiments was to determine, for engines of such small dimensions, the suitability of the Hesselman system, the best conditions for scavenging and charging and the adoption of light-weight materials for the pistons. The results of the experiments have been most promising.

The big job that remains to be done to safely establish the American merchant marine on the world's ocean trade routes is the replacement of many of our obsolete cargo carriers with modern fast economical ships. Unless all the rest of the world is wrong a large proportion of this replacement cargo fleet will be diesel engined ships.

In the Days of the Gold Rush



This interesting view of San Francisco takes one back eighty years to the days when San Francisco Harbor was fairly choked with vessels deserted by their crews for the diggings. The view is from a shoulder of Telegraph Hill, looking south along Sansome Street. The black vessel with plainly marked ports, lying across Sansome Street, is the Niantic. The present office of Pacific Marine Review is directly over the location of her stern. All of the water shown in the bight is now filled-in land, occupied by the down-town portion of San Francisco.

Cold Storage Construction

Some Notes on the Design and Erection of Refrigeration Chambers on Shipboard

By George H. Freear

Van Fleet-Freear Company

WHEN one is confronted with the necessity of supplying refrigerated space aboard ship the prime factors for consideration are: space requirements as to cubic area; where the refrigerated compartment shall be built, taking into consideration the value of the space available for general cargo; the temperatures to be maintained; and the protection of the steel in the way of the refrigerated spaces. The requirements are generally established by the traffic department and, if not too great, the most economical space available is the upper tween decks, which, generally speaking, are somewhat inconvenient to load with general cargo; and inasmuch as refrigerated cargo must be trucked in most cases the upper tween deck space has generally been found the most economical space. Where larger areas are required it becomes necessary to take in the lower tween decks.

Aboad ship it is always economical to prepare every compartment so that it can be used for frozen products if necessary. Therefore, in considering the thickness of insulation it is always advisable to provide for the lowest inside temperature that might be desired and the maximum outside temperature that might be encountered. This means that an adequate thickness of insulation must be used in the construction of the refrigeration compartments.

In erecting cold storage rooms aboard ship we are still using methods which have been in vogue for fifty years or more. While on land we have made great progress in cold storage construction, ship plants remain almost as they originally started. In many instances, due to the insurance bureaus, the cold storage compartment has had to be built 18 to 24 inches away from the ship's side in order that the hull may be inspected and painted regularly. On the under side of the decks, due to the low head room, we have not been quite so careful and have insulated up to the under side of the deck using various methods. In order to get more cubic area for storage in the space available, recent construction has allowed the outboard walls to be built right up against the ship's channels and the space between the outboard walls and the shell of the ship has been filled with loose insulation.

The most up-to-date method of insulating ship spaces is to use more insulation and no wood at all. By this method the ship's side can be protected indefinitely; the under side of the ship's decks can be protected in the same manner; no steel is exposed to the air; no rusting and corrosion goes on; no dry rotting of wood; in short, by using this method of construction, a survival value has been placed on cold storage rooms equal to that of the steel hull. The slight difference in cost is easily offset in the added space given. If we were to dig deep down into facts and find out the cost per cubic foot of space in ship cold storage rooms we would thoroughly realize that every inch gained in the width, length, and height of these rooms adds dollars and cents to the operating revenue.

To date nothing in the way of insulation material has been prepared, manufactured, or shown to ship owners that has the value of compressed corkboard. One of the larger manufacturers of this material has recently developed an especial lightweight corkboard for this purpose. In 100,000 feet of cork used for insulation purpose in the erection of cold storage rooms on a ship, 30,000 pounds of weight have been eliminated by the use of this new corkboard. Its insulation value has been demonstrated and proved by the American Bureau of Standards at Washington.

Using this material in the new, up-to-date construction, wood has been eliminated entirely, the weight of the construction material in cold storage rooms has been cut almost in half, the insulation has been increased, the value of the rooms increased from the standpoint of use to the owners, and the actual cost of construction very slightly increased. If, however, the space gain, the insulation efficiency, and the long life are taken into consideration, the real cost is found to be greatly decreased. When we are considering the requirements for refrigerated space, it could be well to include all these in the analysis and erect the rooms by a modern method. We know full well that the value of insulation lies in just one thing; namely, keeping out heat units. If the insulation allows heat units to pass then we must face the costly expense of continuous operation of the compressors, and we thoroughly understand that power aboard ship costs money.

Commonsense Unemployment Pension

EVERY employe of the General Electric Company in Schenectady who has been out of work last winter, or even on part-time employment, has been cared for financially by the company's unemployment pension plan.

The board of administrators of the plan stated that 682 employes, who have been entirely laid off, have received a total of $69,987 in payments or loans thus far, and that 1509 employes on part time employment have received $38,610 under the plan, making a grand total of 2191 employes assisted and $108,598.47 paid out up to the end of February.

This plan provides for payments into the fund of one per cent. of wages by employes, which is matched by an equal contribution by the company during normal periods of employment; and during any emergency, such as has now been declared, all employes whose earnings are 50 per cent. or more of normal, including all salaried workers from president to office boy, contribute one per cent. to the fund, which is also matched dollar for dollar by the company.

Increasing Patronage for American Lines

By H. T. Herr

Vice-President, Westinghouse Electric & Manufacturing Company

SHIPS are not only delivery wagons: they are trade missionaries, advertisements, investigators, and salesmen. It is natural to do business with those whose ships visit your ports; and if our ships do not visit certain ports, we may be sure that our business interests there will suffer. Therefore, since in the years that lie immediately before us, we must expand our foreign trade, we must have ships of our own to do so. But to have ships of our own, we must build them and keep them busy after they are built.

Some of the Problems Before Us

The problem of building American ships has been partially solved. But, as I think all of us here realize, there is still much to be done in this direction. We must have super-liners and we must have plenty of up-to-date, speedy, cargo vessels. Under present conditions, it is not entirely clear how we are going to get these requisites, but I hope that this Conference will be helpful in this direction.

The problem of maintaining our ships in active operation on the high seas is also as yet incompletely solved. In the first place, we must find some way of neutralizing the admittedly higher cost of operating our ships; and, secondly, when this is done and our ships can compete with those of other nations, our business men must patronize them.

The responsibility of solving the first part of this problem lies with the nation. Some form of legislative action must be taken which will remove from our ships certain handicaps of costs which they have to bear simply because they are American. If this is not done, our whole program of creating future prosperity for the country will be jeopardized, no matter how many ships we build.

As to the second part, this is solely a responsibility of American business. If American business men do not patronize our ships—if they favor foreign vessels whenever they go abroad or have cargoes to despatch—then again our program is endangered. I think this question of increasing the patronage of American vessels can be reduced to two main elements: First, make Amercan business men want to use our ships; and, secondly, make it clear to them that the general prosperity of the country as a whole and of their own business in particular is largely dependent upon the handling of at least 50 per cent. of our foreign trade by our own vessels.

American Shipping Service

Here are a few constructive suggestions that will help to increase the desire of American business men to use American ships.

We must, first of all, match our foreign competitors in the matter of ship speed. This is of vital importance. In a number of routes covered by both American and foreign ships, the foreign ships are more modern and of higher speeds, and inevitably they get the lion's share of the business.

There is also some room for improvement in our methods of selling shipping service. Better solicitation and more sympathetic cooperation with shippers would help in a number of cases. This, of course, is largely a matter of training, and the system of sending the employees of shipping companies abroad where they can study shipping conditions in the various ports of the world and give their customers the benefit of their knowledge and experience is much to be commended. It is especially desirable that shipping companies at all of their important American ports maintain experienced and responsible representatives who can give shippers information, handle complaints, unravel troubles, and make essential rate adjustments. Many an American shipper with a difficult shipping problem on his hands has found himself baffled by a clerical force that is poorly informed and can only stand firmly on the absolute letter of every rule and regulation.

With the exception of the matter of ship speed, which is in part being remedied by our ship building program, these criticisms are not serious and refer to circumstances that can easily be remedied.

American shipping service is already of a sufficiently high quality to attract business for our ships and will continue to improve. But those of us who are directly interested in shipping must never forget that if we are to keep our flag on the seas, American shipping service in all of its phases must be second to none.

American Ships Must have Passengers and Cargoes

Far more difficult is the task of bringing home to Americans generally that if America is to have ships, American ships must have passengers and cargoes. From a shipping standpoint, we are somewhat unfortunate in having so large a country that only a very small percentage of its inhabitants ever come directly in contact with the shipping business. The average American probably rarely thinks of ships in terms of nationality. We must frankly concede our disadvantages in this respect and take such steps as we can to overcome them, always bearing in mind the magnitude of the task of reaching 130,000,000 people scattered over an area of more than three million square miles.

One of the reasons why we need super-liners is that they will convey to everyone in the country the idea that there is such a thing as an American merchant marine and that it is a thing to be proud of and to support. The Leviathan has already done a very great deal in this direction, and much will be accomplished by the splendid ships being built by the Dollar Lines, the United States Lines, and others; but there is nothing like the best and biggest thing in the world to capture popular interest. Congress, I hope, will recognize this fact in considering legislation designed to

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Echoes from the Conference

Short Extracts from the Principal Speeches Delivered at the Fourth National Merchant Marine Conference Held at Washington, D. C.

THE National Conferences on the Merchant Marine are held yearly with the thought of providing a clearing house for discussion on national merchant marine problems. The first meeting, held in January 1928, cleared the way for the Merchant Marine Act of that year with its liberal shipbuilding loan and postal contract provisions that have been so helpful in building up the shipping industry.

A very fine program of speeches and discussion by government officials and by shipping and shipbuilding experts marked the progress of this fourth conference. To reproduce the entire content of the agenda would exceed any possible space allotment, however, here are a few echoes conveying the gist of the principal speeches.

T. V. O'Connor, Chairman, U. S. Shipping Board—"This Fourth National Conference finds the Shipping Board able to say with considerable pride that it has succeeded in transferring by far the greater portion of its vessel property to private interests. Its pioneering work having thus been virtually completed, its future efforts will be largely confined to developing and regulating privately owned shipping in foreign and interstate trade. . . . At present our ships transport only about 40 per cent. of the total tonnage (in value about 33 per cent.) of our exports and imports." When this has been increased to the volume proposed by the Merchant Marine Act of 1920, which looked forward to the time when American ships should carry "the greater proportion of our commerce we feel that we have reached the goal for which we have been striving ever since the Act went into effect."

Robert P. Lamont, Secretary of Commerce — "Government operation with the United States Treasury as a reserve fund in competition with private enterprises totally dulls private initiative. We must get out of government operation as quickly as we can establish private operation. . . . Our shipbuilding industry must strive for the same economies and superiorities in design, engineering, and management that have been so successfully applied by manufacturers in many other lines. The same thing may be said about the management and operation of our ships."

Ernest L. Jahncke, Assistant Secretary of the Navy—"Throughout our country's history its prosperity has been greatly influenced by our water-borne trade, and there has never been a time when that trade has been so important as at present."

Arthur M. Free, Congressman from California, presented figures to show that there are many good reasons for reducing Panama Canal tolls. "We should devise some means by which we will get behind the substantial part of our merchant marine, the cargo ships. I bring this matter of the canal tolls to your attention with this thought in mind."

Royal S. Copeland, Senator from New York.—"With our own bottoms we are secure; without them we are at the mercy of the world."

W. Irving Glover, Assistant Postmaster General.—"I do hope that out of this conference there will come a plan whereby there will be established and put into effect a most intensive educational project to sell the American merchant marine to American people. A small percentage of the advertising budget of the various shipping companies of the country would place before the people of America an educational campaign that would return tenfold results."

Robert Dollar—(Though unable to attend due to illness, Mr. Dollar sent a long telegram to the conference.) "Government departments should set example to private citizens in patronizing American ships. . . . American products favored by government loans should be exported exclusively in American ships. Tariff regulations and treaties should be flexible enough to permit favoring of American ships (cites Canadian and Australian example.) Government should protect American shipping."

H. G. Smith, President, National Council of American Shipbuilders.—Mr. Smith submitted the report of the Committee on the Reduction of Differentials between Shipbuilding Costs Here and Abroad. This committee had reported fully at the 1930 conference and now desired simply to "touch again upon a few of the high spots in connection with this subject." The differential in the case of cargo vessels was "55 to 60 per cent. higher costs in United States yards." For tankers, this differential was somewhat higher; and for combination liners a little lower. These figures assume a normal capacity volume of work in shipyards and conditions substantially equal as between yards here and abroad and the ratio applied specifically to British costs, which are higher than in other foreign shipbuilding plants. Lowering costs here "can be obtained only through the closest cooperation not only on the part of the shipbuilders and the shipowners, but on the part of the government agencies concerned. Our ships must not have requirements in excess of those of foreign nations unless we are willing to pay the costs; they should not have mutual requirements as between the government and the owner beyond those absolutely necessary to secure suitable ships for the service; and the shipbuilders must build as economically as possible consistent with these requirements."

There are too many government agencies involved in ship design and building. "Our navigation laws, the Steamboat Inspection Service, the Classification Societies, the Rules for Maintenance, the Shipping Act, the Load Line Regulations, the Safety of Life at Sea, the Bureau of Public Health, the Shipping Board, and the Navy, the American Marine Standards Committee, and occasionally the British Board of Trade" are all involved; and it would certainly seem that some measure of "consolidation would be of great value to the industry."

Captain H. B. Walker, President, American Steamship Owners' Association.—Speaking for the committee on

Government Aid to Merchant Shipping, Captain Walker repeated the recommendation made in 1930 "providing for the creation of a merchant reserve fleet consisting of vessels divided into certain classes dependent upon their size and speed; upon due notice these vessels would be subject to requisition at any time for service in connection with naval maneuvers; the Shipping Board to contract with owners of these vessels for enrollment in the merchant reserve fleet; and for compensation to said owners in amounts not to exceed differential existing between operating cost of such vessel and operating cost of similar foreign vessel. Pay to be on mileage basis, taking speed and size into consideration."

Modernizing America's Merchant Marine

Homer L. Ferguson, President, Newport News Shipbuilding & Drydock Company.—A very fine address, touching up with a light, artistic brush, all the high lights of the various problems affecting the modernization of naval architecture and marine engineering. After mentioning all the complications of a modern passenger or combination liner, Mr. Ferguson says, "However, in conclusion, perhaps the most important thing to think about just now to help produce a really modern American merchant marine is some stimulus to the building and operation of really modern American freighters. These must be ships with modern lines, modern machinery, and modern freight handling and stowing arrangements. They must be capable of competing with any service and are essential to the proper balance of any merchant marine."

C. L. Bardo, President, New York Shipbuilding Company.—Points to railroad experience in America and raises the question "Is the cargo ship the solution of merchant marine problems?" Perhaps fast combination liners are a better means of moving sea-borne freight and might be more economical. Not, how much does a ship cost? but how much can she earn in a given period? is the important question. "We must use engineering methods and business efficiency and return to the proved principles of speed, comfort, and frequent departures."

Robert Haig, Vice-President, Sun Shipbuilding Company.— After reviewing the history of shipbuilding, especially stressing the part of the United States Shipping Board, Mr. Haig reviews the various types of power plant available to modern ships. He concludes that there is a "very satisfactory future for motor ships. —In this country to-day diesel motors can be built and guaranteed on the same footing as any other type of marine power plant and with a very high degree of economy.—The work that is now being done on the development of still larger and faster ships and on the standard that will worthily represent the American merchant marine at its best."

S. W. Wakeman, Vice-President, Bethlehem Shipbuilding Corporation.—Reviews the modern requirements in American ships; and concludes:

"Notwithstanding the fact that our shipyards have made remarkable progress in reducing ship costs and are better equipped, better manned, and more experi-

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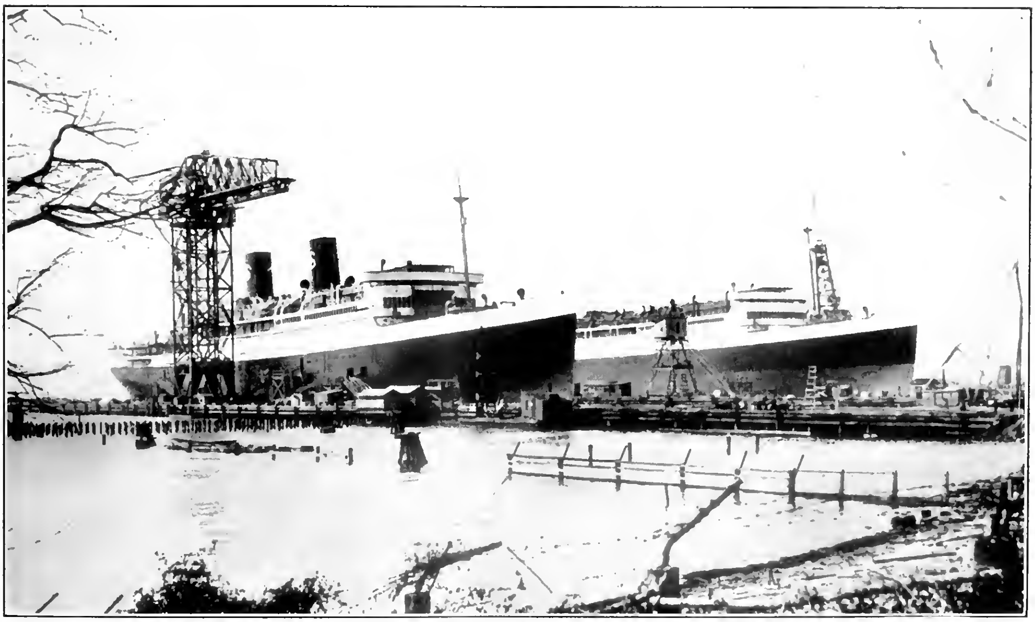
Two New Queens for the Pacific



This picture gives a very clear conception of the size of the two new Dollar liners, President Hoover and President Coolidge, now being completed at the Newport News Shipbuilding & Dry Dock Company's yard, Newport News, Virginia. The photograph was made following the launching of the President Coolidge and shows the two ships at the outfitting dock of the plant.

World Shipping Situation

By A. E. Sanderson

Transportation Division, U. S. Department of Commerce

THE shrinkage that has taken place in the world's oversea trade is reflected in large measure by the latest returns for idle tonnage. These are striking in their contrast with the corresponding returns of a year ago in that they represent increases for individual countries of several hundred per cent., or up to nearly 1,500,000 gross tons.

In the principal maritime countries, taken as a whole, there were about 8,276,000 gross tons of shipping laid up on January 1, 1931—an increase of 5,058,000 tons, or 150 per cent., over that of a year earlier. Great Britain fared the worst, with approximately 1,445,000 tons, or 300 per cent. more, while the United States was affected to the extent of about half a million tons increased, traceable entirely to privately owned shipping. Another noteworthy feature is that German shipping to the amount of nearly 500,000 tons was laid up, as compared with practically none a year ago.

Charter rates on representative trade routes, July–December, 1930

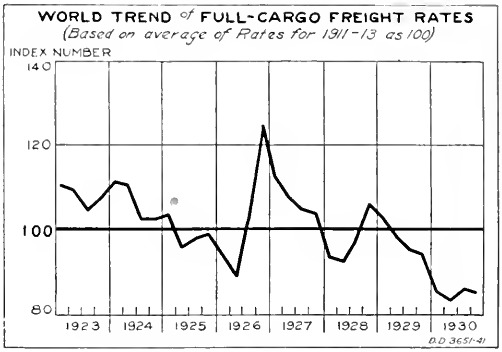
Commodity and route	Third quarter, 1930 High		Third quarter, 1930 Low		Fourth quarter, 1930 High		Fourth quarter, 1930 Low	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d*
Coal:								
United Kingdom to River Plate	18	0	10	6	16	0	10	0
United Kingdom to Genoa	8	0	5	10½	6	9	5	4
United Kingdom to Port Said	7	6	6	6	7	0	6	3
United States to River Plate	15	2	12	10	14	2	10	5
Wheat:								
River Plate to United Kingdom or Continent	21	0	9	6	24	0	10	0
United States (Atlantic) to United Kingdom	2	6	1	6	2	6	1	6
Australia to United Kingdom	35	0	25	0	35	0	29	0
Lumber:								
United States (Gulf) to River Plate	142	6	140	0	135	0	130	0
United States (Gulf) to United Kingdom or Continent	105	0	105	0	110	0	102	6
Rice: Burma to United Kingdom or Continent	19	0	18	0	21	0	18	0
Sugar: Java to United Kingdom or Continent	(1)				(1)			
Nitrate: Chile to United Kingdom or Continent	22	9	20	0	22	0	19	0

[1] No record of fixtures found.

In considering these figures it should be borne in mind, of course, that an altogether complete account of the lack of employment would have to include the increase in the unoccupied space of liners, many of which have not been withdrawn from service despite the falling off in trade. Data of this nature, however, are not available at this time.

Freights Lower

The chronic weakness of the freight market indicates that recovery from the present depression is not likely to be more than gradual. Full-cargo rates, which are representative in large measure of the market in general, were consistently lower in 1930 than in any other postwar year. The index numbers of these rates, as compiled by the Transportation Division based on six representative commodities over 12 leading world trade routes, stood at 85 for the last quarter of 1930, in contrast with 94 for the last quarter of 1929.



The accompanying graph traces the fluctuations in full-cargo rates since the beginning of 1923. There is also a table of the actual high and low charter rates for the third and fourth quarters of 1930.

Shipyards Less Active

A pronounced decline in total world shipbuilding is evident from the latest returns. These show that there were under construction only 2,316,000 gross tons of merchant vessels at the end of 1930 as compared with 2,965,000 at the end of 1929. The decline, therefore, amounted to 649,000 tons, or 22 per cent. Work in British and Irish yards fell off by an amount exactly equal to the total tonnage decline, but by a percentage which reached as high as 42. This was the result largely of the completion of many Norwegian orders

Idle steam and motor shipping of the principal maritime countries on January 1

[In thousands of gross tons]

Country	1927	1928	1929	1930	1931
Idle in home country:					
United States—					
Shipping Board	2,336	2,371	2,160	1,531	1,452
Shipping Board tankers	56	41	31	6	6
Privately owned	457	544	603	447	1,105
Government owned, other than United States Shipping Board	27	22	22	22	11
Total	2,876	2,978	2,816	2,006	2,574
Great Britain and Ireland	529	539	467	521	1,966
Italy	128	276	261	180	655
Norway	37	93	20	12	595
Germany	------	------	------	8	484
Japan	48	85	53	90	343
Netherlands	3	16	------	4	324
Greece	106	77	71	87	223
France	118	80	132	91	219
Australia	71	93	41	90	171
Sweden	9	35	2	3	131
Spain	35	43	22	22	120
Denmark	20	26	------	------	91
Belgium	14	1	4	14	77
Idle in foreign countries [1]	100	65	76	90	305
Grand total	4,094	4,407	3,968	3,218	8,276

[1] Refers mainly to countries listed above.

for tankers. Work in American yards, however, was greater through the stimulus of the Merchant Marine Act of 1928 which liberalized the government construction loan facilities and provided a comprehensive schedule of higher rates for the carriage of ocean mails to foreign countries in American ships.

Motor ships still constitute appreciably more than half of all the tonnage under construction—about 57 per cent. as compared with 55 per cent. a year ago.

Oversea Trade Unfavorable

The world's oversea trade in 1930 appears to have been unfavorable on the whole. The extent of the decline however, cannot be measured precisely at this time as the available statistics are incomplete. Traffic through Panama and Suez Canals may be taken as an indication, and both these canals show a heavy decline. Exclusive of tanker cargoes, the Panama Canal handled 22,000,000 long tons of cargo in 1930, a decline compared with 1929 of 3,361,000 tons or 13 per cent. Suez Canal, on the same basis, handled 20,343,000 metric tons during the first 10 months of 1930, a decline of 5,186,000 tons, or 20 per cent., compared with same period in 1929.

Steel steamers and motor ships under construction in principal shipbuilding countries[1] on December 31

Country	Steamers		Motor ships		Total	
	1929	1930	1929	1930	1929	1930
Great Britain and Ireland	788	464	765	440	1,553	904
United States	128	187	43	43	171	230
Germany	167	41	86	177	253	218
Italy	15	103	63	76	78	179
France	90	129	77	44	167	173
Netherlands	40	7	192	153	232	160
Sweden	11	11	87	135	98	146
Denmark	9	4	96	104	105	108
Japan	18	......	166	86	184	86
Spain	3	......	36	59	39	59
Norway	24	11	19	10	43	21
Danzig	5	12	......	......	5	12
Belgium	15	5	......	2	15	7
Other countries	17	10	5	3	22	13
Total	1,330	984	1,635	1,332	2,965	2,316

[1] Excluding Russia, for which country 1930 returns are not yet available.

(Abstracted from Commerce Reports)

Echoes From the Conference

(Continued from Page 149)

enced than ever before, the requirements of the owners and the government are more than offsetting the savings made by the shipbuilders. The trend of today is unmistakably that modern ships are becoming larger, faster, safer, and more palatial in their passenger accommodations. Naturally such advantages must result in increased cost, which the owner must justify by the increased earning power. Shipbuilders take pride in endeavoring to produce efficient modern ships, and it is hoped that these vessels now building will return maximum profits to their owners."

Increasing Patronage for American Lines

Kermit Roosevelt, President, Roosevelt Steamship Company.— Recommends hard, persistent work to overcome apathy of the great American manufacturers and producers toward giving American ships preference in shipping their products.

Frank C. Munson, President, Munson Steamship Lines.— Emphasized need of "constructive propaganda being spread throughout the country in favor of American lines carrying passengers and freight. There are more empty rooms and more empty space on American flag ships than ever before in our history; and the American steamship owner and operator need the support of the American traveler and the American shipper as never before."

Captain L. H. Porter, Superintendent of Ship Personnel, Munson Line.—"It is time that Americans awaken once more their sense of loyalty to American industries, and give not with the spirit of charity but of sincere patriotism their whole-hearted support in travel and freight to American operators."

Fred Brenckman, Washington Representative, National Grange.—Suggests that the Division of Foreign Agricultural Service set up by the Capper-Ketcham bill during 1930 will be very helpful in encouraging the use of American ships.

Thor Hultgren, Agricultural Economist, U. S. Department of Agriculture.— Suggests that American operators should use to a greater extent the information available in the United States Department of Agriculture and in state agriculture experiment stations to enable them to give better advice and better service to shippers.

Malcolm Stewart, Middle West Foreign Trade Committee.—Suggests a department of publicity in connection with research department of Shipping Board to arrange for distribution of typical information of a regional character to reach every chamber of commerce or board of trade within the United States; and indicates typical uses of this material for building up a national urge to use American ships.

Patronage for American Lines

(Continued from Page 147)

make these great ships possible. A widespread "slogan" campaign might be effective. If, for a while, some such phrase as "Travel and ship on American ships" were to be placed before the eyes of every American citizen, patronage would almost certainly be considerably increased.

Most important, however, is to educate our manufacturers, merchants, farmers, and all other business men, and our workers as well, as to the fundamental reasons why America needs ships.

It is the duty of all of us who are directly interested in shipping matters to lend our assistance in carrying on this educational undertaking. Many of you are doing this very thing—speaking before business and civic organizations, printing articles in magazines and newspapers, and spreading the gospel in other ways. But much more is yet to be done.

Fortunately, this operation of educating our people as to our merchant marine is cumulative in its effect. The more of the better kind of ships we build, the more people they carry, and the more goods we ship in them, the better they will become known and the more business they will get. In other words, the best way to build up the American merchant marine is to go ahead and build it up.

(Abstract of an address at the Fourth Annual Merchant Marine Conference, Washington, D. C., January 21, 1931.)

The Electric Drive in Great Britain

By R. C. W. Courtney

IT is now twenty years since the experiments conducted on the Clyde by Mavor and Coulson with the launch Electric Arc demonstrated not only the possibilities of electric propulsion but also that alternating current was preferable for the large powers generally associated with marine work. This little vessel had a length of 50 feet and was equipped with a 45 brake horsepower gasoline motor directly coupled to a generator. The engine turned at 800 and the propeller 400 revolutions per minute, the average speed in service being 8 miles per hour. The experience gained led to a larger vessel, which was constructed by Swan Hunter and Wigham Richardson in 1913. This craft, the Tynemount was designed for service on the Great Lakes to Canal dimensions, the length being 250 feet with a beam and depth of 42 feet 6 inches and 19 feet. The power plant comprised two 3-phase generators, each driven by a 6-cylinder Mittlees diesel at 400 revolutions per minute which supplied current to a single 3-phase motor developing 500 shaft horsepower at 800 revolutions per minute. Owing, however, to a combination of circumstances the performance in service unfortunately did not come up to expectations and the plant was replaced by orthodox machinery, the diesels themselves being utilized for land purposes.

A still larger vessel, the Wulsty Castle was completed at Sunderland in 1918 for the Castle Line in which a novel system of turbo-electric drive was installed. This ship had dimensions 356 feet 3 inches by 48 feet 9 inches by 25 feet 11 inches and carried turbo-alternators developing 625 kilowatts apiece at about 6000 tons deadweight Two Ljungstrom type 3600 revolutions per minute supplied current to two main induction motors, together developing 1500 shaft horsepower which were coupled to a single propeller shaft through double reduction gearing.

The most important of the earlier British-built electric ships is the San Benito, completed in 1921 by Workman Clark & Co. for the United Fruit Co. and powered by the British Thomson Houston Co. This vessel is of the standard fruit-carrying type and is 325 feet long, 46 feet in breadth and 31 feet 9 inches in depth, the gross tonnage being 3724. The machinery embodied the extensive experience of the General Electric Company on electric drive and comprised a single turbo-generator arranged amidships with three single-ended, oil-fired Scotch boilers 15 feet 10½ inches diam. by 12 feet 2 inches, the propelling motor being located right aft in a separate compartment. The alternator is rated for 2040 kilowatts at 3000 revolutions per minute and is directly coupled to a 9-stage Curtis turbine. The motor delivers 2500 shaft horsepower at 100 revolutions per minute with current at 1100 volts, 50 cycles, and maintains a service speed of 12½ knots. Two similar vessels in which the generating medium consisted of four Cammellaird Fullagar diesel sets were commissioned in 1925; but in both cases it was decided after a brief period of service to replace the original oil engines, in one case by Fiat diesels and in the other by steam machinery of greater power. The conversion of the latter vessel, the La Marea, carried out last year by Workman Clark, was of a very interesting nature as it included lengthening the ship by about 30 feet and entirely reconstructing the midship portion. The new plant is of the high pressure type with two Babcock and Wilcox boilers designed for 370 pounds working pressure and 264 degrees of superheat with oil firing in the Todd system. The generator is of the British Thompson Houston-Curtis type of 2700 kilowatts at 3000 revolutions per minute and supplies current at 1200 volts to a 3-phase, enclosed, synchronous propelling motor, rated for 3300 shaft horsepower at 120 revolutions per minute the designed speed being 14½ knots. The ship was renamed Darien, and contemporary with her reconstruction two larger and more powerful fruit carriers, the Platano and Musa, were built by Cammel Laird and Workman Clark, respectively. These ships were originally ordered by Elders & Fyffes, but were transferred to the United Fruit Co. shortly after completion. Leading characteristics are as follows: Length between perpendiculars 415 feet; breadth molded, 56 feet; and depth to upper deck 34 feet; the gross tonnage being 5833 and service speed 16 knots. The turbo-electric machinery was supplied by the British Thomson Houston Co. in both cases and again consists of a Curtis turbine directly coupled to a 3-phase alternator which supplies current at 2600 volts to a propelling motor of 7000 shaft horsepower. Five single-ended, oil-fired, cylindrical boilers, with a working pressure of 275 pounds, are provided, whilst an extensive equipment of independent electrically operated auxiliaries is installed, the power for which is supplied by two 500-kilowatt and one 175-kilowatt turbo-generator.

The P. & O. liner Viceroy of India has already been fully described in Pacific Marine Review and reference has also been made to the new ships Strathnaver and Strathaird now under construction for the same owner's Australian service. The former was recently launched at Vickers Armstrong's Barrow yard and further details are now available.

The principal features are:

Length between perpendiculars	630′ 0″
Length overall	664′ 0″
Breadth	80′ 0″
Depth to E deck	46′ 6″
Draft	29′ 0″
Passengers	1166
Crew	476

There are nine decks, and extensive refrigerated space is arranged in No. 2 and No. 3 holds and tween deck spaces, the cooling medium being carbon dioxide plant with brine piping. Provision is made for 498 first class passengers, 262 in single berths, and the rest in double berth cabins, whilst the remaining accommodation will be entirely for the use of tourists; and apart from her electrical machinery the new liner will be one of the outstanding ships of 1931. The power plant is designed for 28,000 shaft horsepower in two shafts for 22 knots in service and is the highest powered of its type that has so far been fitted in a merchant vessel. The generating medium consists of two British Thomson Houston-Curtis impulse-type turbo-alternators having a maximum rating each of 10,700 kilowatts at 3000 revolutions per minute, 3 phase, 3000 volts, which are located amidships with the boilers. The propelling motors, each 14,000 shaft horsepower, 125 revolutions per minute, 3000 volts, 3 phase, are located 125 feet abaft the engine rooms so that a considerable amount of friction load due to intermediate shafting will be eliminated. The steam generating installation comprises four Yarrow-type, high-pressure, water-tube boilers of the five-drum, side-fired type, fitted with air preheaters and superheaters, the working pressure being 400 pounds and the superheat temperature 725 degrees Fahrenheit. Two auxiliary boilers are also to be provided of similar design to the main boilers. These ships will have an imposing appearance with three large stacks and are to be painted white, a distinct breakaway from P. & O. conventions.

Additional information is also available respecting the new coastal liner for the Union Steamship Co. of New Zealand for service between Wellington and Lyttleton which is also being built at Vickers Armstrong's Barrow yard with British Thomson Houston propelling plant. In this case a somewhat similar system of operating at varying speeds to that followed out by the Viceroy of India is being arranged. The vessel will normally run a night service at 17 knots with one turbo-alternator driving the two propelling motors but in holiday seasons the double run will be made in 24 hours at 20 knots with both generating sets in operation. The maximum output will be 13,000 shaft horsepower on twin screws and not with a quadruple screw arrangement as was at first reported.

Four propellers are, however, being given to the Furness Bermuda Mid Ocean, which will also be a notable ship in many ways. The approximate tonnage is given as 22,000 and a high degree of luxury, including two swimming baths, is being provided. The hull is being built at Walker-on-Tyne and the turbo-electric machinery of 19,000 shaft horsepower by the British General Electric Co. Steam will be supplied by eight Babcock & Wilcox water-tube boilers, and completion will probably be effected during the latter part of the present year.

The two large tankers, Winkler and Permian, for the Atlantic Refinery Co. of Philadelphia have now been completed on the Clyde. Their diesel-electric installations differ from those of the preceding vessels in that direct current is used, the generating plant consisting of four 6-cylinder Ingersoll-Rand-Carel airless-injection diesels each developing 750 brake horsepower at 250 revolutions per minute and directly coupled to a British Thomson Houston generator of 600 kilowatts and 250 volts. These operate in series, and the propelling motor is capable of 2800 shaft horsepower at 1000 volts, the revolutions per minute being 95.

Diesel-electric drive has also been seriously considered for several new cross-channel vessels which have recently been ordered for service between the British Isles and the Continent, and an interesting contract has been placed with Wm. Denny and Sons, Dumbarton, for a moderately sized vessel of this type which will maintain communications between the islands off the West Coast of Scotland and the mainland.

Canadian Pacific Liner Empress of Britain

The new 42,500-ton liner, Empress of Britain of the Canadian-Pacific's Atlantic fleet, will go into service between Southampton, Cherbourg, and Quebec a month earlier than expected, her first sailing now being scheduled for May 27, making the crossing in five days. She will be commanded by Captain R. G. Latta, well known in San Francisco circles as the commander of the world-cruiser Empress of Australia.

On her round-the-world cruise in 1932, the Empress of Britain will call at San Francisco, at daybreak, March 20, and stay two days in port, the largest passenger liner ever to enter the Golden Gate.

Picture shows the Dollar Liner President Jackson alongside the Tacoma grain pier at Tacoma, Washington, in December. She is taking on the first cargo of wheat and flour shipped from that terminal after completion of its alterations and enlargements made during 1930. The main line tracks are shown running on fill where the old dock formerly stood. Forty-five feet of water at the ship's position.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

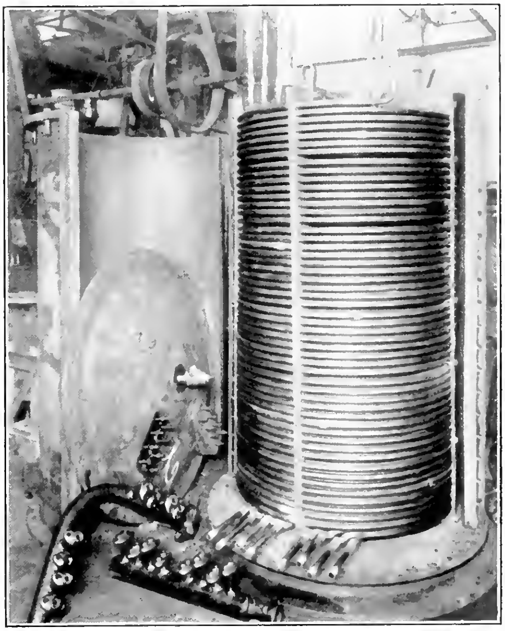
Part V—Refrigeration Machinery

By L. L. Westling

THERE are volumes of printed matter on the subject of mechanical design of compressors and auxiliaries, and it is not the intention of this treatise to cover this phase of the subject. There is, however, certain data which should be known in the lay-out of a complete plant. Capacities of the compressor and evaporator (brine coolers) are spoken of in terms of "tons of refrigeration". Tons of refrigeration is one of the most misunderstood terms in engineering. Contrary to the thought it seems to convey, it does not represent the ice making capacity of the plant. It represents, rather, the comparative refrigerating effect of one ton of ice in melting.

Ice making requires the cooling of the water to a temperature of 32 degrees Fahrenheit from its initial temperature which is, of course, a variable factor. Mechanical and thermal losses in the process give a rough or general ruling that the ice-making capacity of a plant is approximately one-half its ice-melting effect. It has been established that one pound of ice upon melting absorbs 144 B. T. U.; hence, one ton of ice-melting capacity or one ton of refrigeration represents a heat removal of 2000 x 144 or 288,000 B.T.U., and as a rate basis it is arbitrarily accepted as the absorption per day of 24 hours.

In previous chapters it has been pointed out that the pressure or corresponding density of gasses on the suction and discharge sides of the compressors affect the capacity of the plant. For example, take the exaggerated condition of having suction and discharge pressures the same. But little work can be done on the gas and the refrigerating effect is nil. Or assume a very high vacuum on the suction and a very high discharge pressure. Due to the rarified suction gas but little gas is handled; yet much work is done by the high degree of compression on the discharge side. In consequence, when we speak of the capacity of a compressor other conditions beside cylinder dimensions and speed must be considered. In specifying compressor equipment one should always specify conditions—preferably the rating as given by the American Society of Refrigerating Engineers. The standard ton rating of ammonia systems requires a suction pressure of 19.57 pounds per square inch and a temperature of 5 degrees Fahrenheit; a discharge pressure of 154.5 pounds per square inch and a temperature of 136.6 degrees Fahrenheit. The standard ton with carbon dioxide gives a suction pressure of 319.7 pounds per square inch and 9 degrees superheat, and a discharge pressure of 1024.3 with 99 degrees superheat.

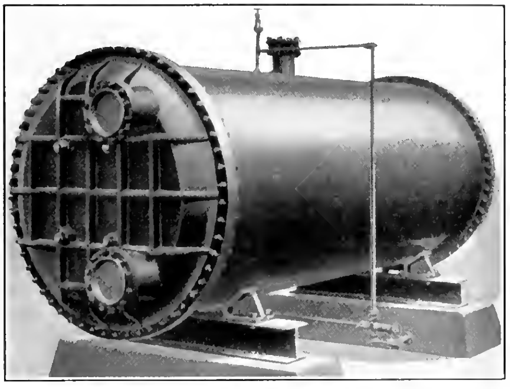


A coil-type condenser for a marine refrigerator plant, Brunswick-Kroeschell manufacture.

Condensers

Condenser equipment is generally supplied by the manufacturers of the compressors. Ammonia condensers are usually of the double pipe design. Ammonia is corrosive to copper alloys, hence black iron is always used. Carbon dioxide condensers, because of high pressures used, are generally of seamless steel tubing, although copper tubing may be used. The tubing is usually in the form of spiral coils, through which the gasses pass; and these coils are submerged in the circulating water held by an outer casing of steel or cast iron. Fitted joints in the gas carrying coils should never be allowed inside of heat transfer equipment, but the ends should always extend through the enclosures to the outside for connections. Steel carbon dioxide coils are always joined by the electric welding process, and copper connections are made by brazed cupped joints. High pressure tests should be made before assembly. Condensers of the double pipe type should have eight square feet of cooling surface per ton of refrigeration. Condensers of the shell and tube type should have 18 square feet of cooling surface per ton of refrigeration.

In designing a condenser plant, it is advisable to have 100 per cent. reserve capacity and so piped that either side or both sides may serve the compressors. For highest efficiency the circulating water should always flow in the opposite direction to the gas flow. We have pointed out in earlier chapters how the rate of heat transfer is increased with the increase of temperature differences, and contraflow produces that effect to advantage. In heat exchanging equipment the final temperature difference is often not more than five degrees. When the outgoing refrigerant in a condenser is being cooled by sea temperature water, a much lower temperature is attained by the liquor passing to the receiver. This factor is especially necessary to carbon dioxide systems operating in high temperature sea water, as it removes the liquor farther away from its critical temperature; i.e., 88.43 degrees Fahrenheit, at which point there is no refrigerating effect.



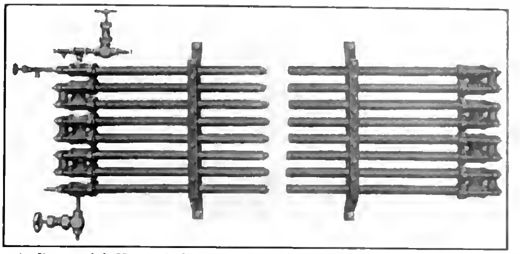
A horizontal brine cooler as manufactured by the York Manufacturing Company.

In specifying condenser conditions the highest expected temperature of circulating water should be stated. Ships travelling through tropical seas may frequently have 86 degree water.

The questions of proper amounts of circulating water involving the circulator or other pumps is often hard to answer, but a rough ruling supplying sufficient flow is 3½ to 4 gallons per minute per ton of refrigeration.

Brine Coolers—Evaporators

Brine coolers or evaporators are built in several designs, the two of widest acceptance are the brine submerged gas coils or shell and coil type, and the shell and straight tube type. The first type is most often found aboard ship. The outer casing is circular or rectangular and of cast iron or made of steel plates and shapes. The cooling elements should be placed to insure that they will always be flooded with the liquid refrigerant because the heat transfer is much higher between the boiling refrigerant and the brine than it is between the expanded gas and the brine. Carbon dioxide plants always have the refrigerant within the coils, while with ammonia the pressure is such that it may be either inside or outside of the coils. The disadvantage of the brine-in-the-coils type is the excessive amount of refrigerant required to flood the coils. The manufacturers of such equipment have their own standards for cooling surfaces of these coils, but a satisfactory "rule of thumb" states that there should be from 120 to 150 lineal feet of 1¼ pipe (or equivalent thereto) per ton of refrigeration. Brine coolers can now be obtained with a guarantee of but 2 degrees difference between refrigerant and brine.



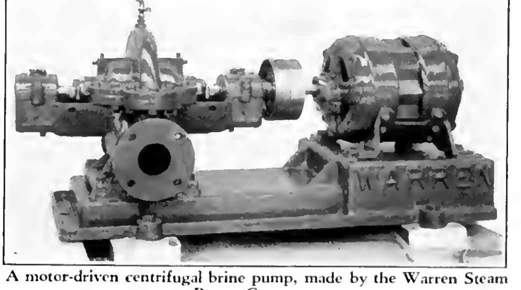
A Brunswick-Kroeschell double-pipe, counter-current condenser.

Brine Pumps

Brine pumps may be of any type unit. Reciprocating duplex pumps serve well, monel fitted. Simplex reciprocators should be avoided because of water shock in the system which often produces pipe noises that are very disturbing to passengers and crew. Reciprocating units of any kind should have generous air chambers at the pumps and at the ends of long discharge pipe leads. Rotary and centrifugal pumps are most desirable when electric motor driven. Small turbine units are of too low efficiency to be acceptable. All brine ends of pumps should be enclosed in casings packed with granulated cork, and so designed to permit frequent and easy access to the pump parts. With a five degree rise of temperature of brine through the coils there should be circulated from 7½ to 8 gallons of brine per minute per ton of refrigeration.

Brine Tanks

Brine return tanks are of various designs and their detail is affected by the method of brine circulation. They are usually made of plates and shapes and, if in the open, are heavily insulated. If within an insulated



A motor-driven centrifugal brine pump, made by the Warren Steam Pump Company.

brine room a light insulation will prevent heavy frosting of the tank sides. Closed brine systems drain to an enclosed return tank, which is vented to prevent air binding and to permit expansion or contraction. The enclosed system has an advantage in that the brine room is always dry and ship shape. The open system drains into the tank in open streams, and the flow is always under observation, which is advantageous. The open tank should have strainers above the brine level to prevent the entrance of any foreign matter that might injure the brine pumps or clog the system.

Brine make-up tanks should be made in three compartments similar to a hot well. The first compartment should have a raised and perforated bottom, the compartment size to accommodate the desired amount of calcium chloride. A water tap should be located over this. The second compartment should extend under the above strainer bottom and should also be separated from the third compartment by a plate lower than the tank rim. The third compartment bottom should drain to the brine tank to the make-up brine pump suction. This construction should give proper density control and should prevent the solid chemical from entering the brine system.

Brine Heater

Vessels whose chambers might be under refrigeration for extended periods, and whose coils might gather heavy frost should be equipped with a brine heater. The heated brine should be circulated at proper intervals to defrost the coils, as excessive frost will impede the air circulation in the chamber. Frost is also an effective insulator. Coil defrosting may be effected by cutting off the brine or gas until melting is completed, but warm brine is more rapid and the cargo is not without refrigeration for any questionable period of time.

Pipes and Fittings

Ammonia piping or fittings are always of iron, never galvanized. The sizes are determined by the size of the plant and the branches by their connected load. Ammonia flange unions or electric-welded connections should be used whenever possible, although miter-weld joints are not to be recommended. Threaded joints where unavoidable should be made up with glycerin and litharge. Compressor suctions should always connect from the top of return header and loop down to cylinder as an additional safeguard against liquor being drawn in with the suction.

Carbon dioxide piping should be made up of seamless steel tubing with welded joints, and all fittings should be of forged steel. The assembled plant should be tested with air to 2000 pounds per square inch before charging with refrigerant.

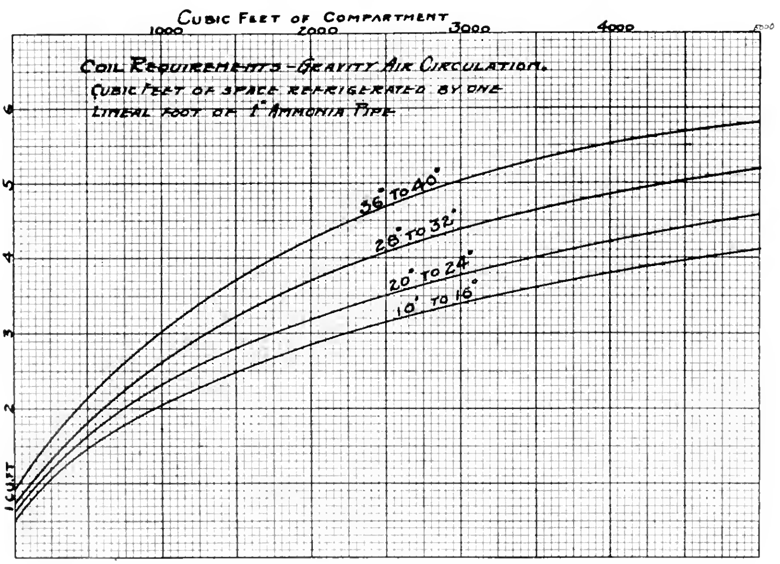
Brine piping should be made of iron, preferably galvanized after being cut and fit. Threads should be avoided, and when necessary made short, exposing as little of the thread to the air as possible. Long or running threads should never be permitted, as exposed threads are always the vulnerable point, and the chemical action of the brine and air will rust threads very rapidly. Plug valves or cocks should be avoided due to their frosting up, gate valves being preferable.

Pipes carrying low temperature brine or gas should be insulated with the best cork forms, bound with copper or brass wire, and all seams well sealed from the air. Where moisture can gain access to the piping, frost forms forcing away the insulation, rusting the pipe, and causing loss in efficiency.

Pipe hangers should be on the outside of the insulation, which should be protected from the hanger by means of an iron plate saddle or cradle.

Spare Equipment

In designing a plant for marine service, reserve and stand-by capacity in all units is desirable. At sea where ready repairs and spare equipment is not available, an extended shut down is certain to bring heavy loss of perishables. In smaller plants, spare parts, such as are required by the Classification Societies, are sufficient; but on larger plants a stand-by compressor, condenser, evaporators, brine pumps, etc. should be specified. Stand-by equipment for direct-ex-



A convenient graph for approximating ammonia coil requirements for refrigerated compartments with gravity air circulation. The vertical scale gives the cubic feet of space that may be taken care of per lineal foot of 1-inch ammonia pipe within the temperature limits marked on the curve and for various sizes of compartment listed on the horizontal scale.

pansion systems is more imperative than for the brine operated plants, inasmuch as the low temperature brine has reserve refrigeration capacity after the compressor is shut down.

Spares Required by American Bureau of Shipping

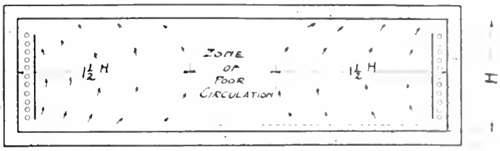
1 crank shaft, complete, with eccentric sheaves, or 1 halfshaft where interchangeable
1 cover of each pattern for compressors
1 piston and rod with nuts, complete, of each pattern for steam cylinders and compressors
1 slide valve spindle and nuts of each pattern
1 pair main bearing bushes, complete
2 main bearing bolts
1 set of piston rod and connecting rod bolts and bushes
1 eccentric strap and rod, complete, of each pattern
Main and cut-off valves and valve face, with pins, for steam cylinder
1 brine pump bucket and rod
1 air pump bucket and rod
1 circulating pump bucket and rod
1 compressor gland and packing, complete
1 set compressor suction and delivery valves, with springs and boxes, complete
1 set of valves for air, circulating, and feed pumps
1 set of valves and springs for brine pump
1 crank shaft for fan engine
1 set of top and bottom end bushes and bolts for fan engine
1 set piston rings for fan engine
1 of each pattern of ammonia or carbon dioxide valve and cock flange and fittings
Blocks for making all leather packing
6 tubes and 24 ferrules for condenser
1 of each kind of pressure guage
Assorted lengths of bends of piping, together with flanges, couplings and screwing appliances
A supply of assorted bolts, nuts, studs, packing, joint rings, compressor rings, and leathers

Where one duplex or two single ammonia or carbonic-anhydride compression machines are fitted:

1 piston rod with nuts, complete, of each pattern, for steam cylinder
1 slide valve and valve face, with pins, for high pressure steam cylinder.
1 slide valve spindle and nuts of each pattern
2 main-bearing bolts
1 set of piston rod and connecting rod bolts and bushes
1 set of piston rings, etc., for each steam cylinder, and for fan engine
1 eccentric strap of each pattern
1 air pump bucket and rod
1 circulating pump bucket and rod
1 brine pump bucket and rod
1 compressor gland and packing, complete
1 compressor suction and 1 delivery valve with springs and box, complete
1 set of valves for air, circulating, and feed pumps
1 set of valves and springs for brine pumps
1 crank shaft for fan engine
1 piston rod, complete for fan engine
1 set of top and bottom end bolts and bushes for fan engine
1 of each pattern of ammonia or carbon dioxide valve and cock, flange, and fittings
Blocks for making all leather packing
6 tubes and 24 ferrules for condenser
1 of each kind of pressure gauge
Assorted lengths and bends of piping, together with flanges, couplings, and screwing appliances
A supply of assorted bolts, nuts, studs, packings, joint rings, compressor rings, and leathers

Refrigerating Coils

Room coils should be so proportioned that the chamber can be used for any temperature from sharp freezer to a banana carrier. This can be done by dividing the



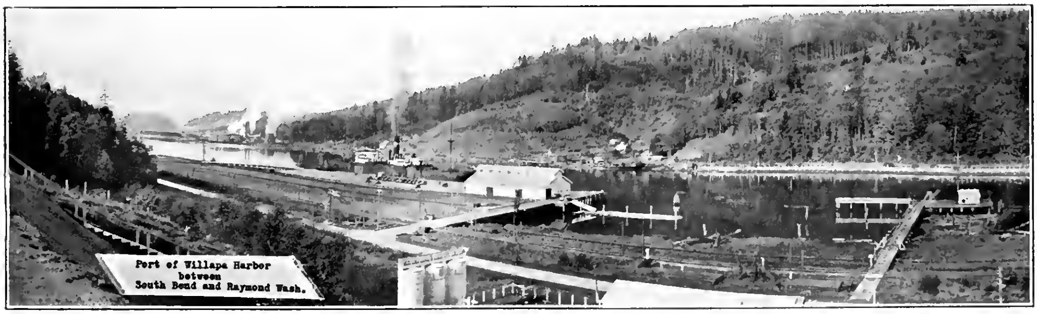
A diagrammatic representation of a simple rule that will help in designing refrigeration chambers and the arrangement of coils therein.

coilage into two circuits of ratios of one-third and two-thirds, and each circuit to make a complete belt about the room. As a sharp freezer both circuits are used, for freezer the 2/3rds circuit only, and for chill or cooler the one-third circuit. The one-third belt should be the upper coil when direct expansion or low temperature brine is used as such an arrangement will assist in preventing too severe conditions for chill cargo stowed at the foot of the coils.

The total cooling surface for any space is based upon the refrigerated load. Referring to the chapter on Specific Heats (Chapter II) the method is clearly shown for this calculation. The carrier is seldom called upon to freeze cargo as such stowage is usually delivered to the ship's side in frozen condition. The curves herewith indicate a safe schedule for room coils with gravity air circulation. For bunker or coil room systems and forced air circulation, from 50 per cent. to 60 per cent. of these requirements may be used. It is suggested that 25 per cent. additional cooling surface be provided with brine coil systems.

The coils should be very carefully located. They should cover all walls as far as is practical for even distribution of refrigeration. If the "belt" of direct-expansion coils contains more than 800 lineal feet of 1-inch pipe, the circuit should be split with 2 inlet and outlet connections to prevent the inlet end doing most of the refrigerating work or causing localized refrigeration. One brine circuit should not have more than 450 feet of pipe. Small diameter pipes give the best results, the refrigerant liquid being distributed through a greater length of coil and the higher velocities increase the rate of heat transfer.

A New Development on the Washington Coast



The port of Willapa Harbor showing new wharves, warehouse, and ship-side tracks. Willapa harbor lies between South Bend and Raymond, Washington, and is served both by the Northern Pacific and the Chicago, Milwaukee, and St. Paul Railways and excellent state hig'iway connections.

Diesel Engine Lubrication

Part III. The Special Problems Involved in the Efficient Lubrication of the Bearings on Marine Diesels

By Arthur M. Tode

Diesel Engineer, Technical Department, The Texas Company

WRIST pins, crank pins, main bearings, and crosshead guides of diesel engines require careful lubrication. With the possible exception of the wrist pins, which are contained in an enclosed position and may be subjected to considerable unradiated heat, the above parts will, in general, involve no difficult lubricating problems. Pressures are usually high, clearances low, and operating speeds frequently high; yet the circulating force feed oiling system, the mechanical lubricator, or the principles of splash lubrication (in the enclosed crankcase engine) are all readily adaptable.

On large engines the first is preferred by many authorities. In effect it is probably the most dependable system in that it furnishes a continuous stream of oil to all the bearing parts in question, assures an adequate oil wedge, assists materially in cooling, and is capable of being put in series with a filtration or purification system which will insure the delivery of practically pure oil, thus eliminating the possibility of clogged oil ways. Furthermore, the oil feed to each part, in certain cases, can be independently controlled. One oil is generally used for all bearings of a diesel engine and should be selected to suit those bearings subjected to severest operating conditions. With the mechanical lubricator it is possible to make it serve both cylinder and bearing lubrication by keeping the requisite lubricants in separate compartments.

A variation exists in the pressures used on lubricating systems. While with some engines the pressure will not exceed five pounds per square inch, in others it is carried as high as twenty pounds. This pressure will be influenced by bearing clearances, and a noticeable drop in pressure may occur with a new engine as the wearing in of the bearings progresses.

The quantity of oil circulated through the bearing lubricating system varies widely in different engines, being dependent on the size and speed of the units as well as the method of lubricating system installation. The chief requirement is that the amount circulated shall be greatly in excess of what is actually required for lubrication, so that the large amount of oil flowing through the bearings may serve as a cooling medium in addition to maintaining a film between the bearing surfaces.

Oil Wedge Principle

Where shafts or journals such as the main and other bearings are involved, effective lubrication can be most dependably attained by providing for passage of oil from the low pressure to the high pressure area. As a general rule this will mean from the upper to the lower part of the bearing.

For this reason oil holes are usually located in the top part or cap of the average bearing, when lubrication is to be maintained from an external source. In addition, by suitable grooving of the top part or low pressure area of such bearings, where practicable, delivery of adequate oil to the point of entry of the high pressure area can be more nearly obtained.

When a bearing which is at rest starts to revolve, the lubricating oil adhering to the journal is drawn in the form of a wedge into the pressure area. If the velocity of the bearing is very low, and especially if the oil be viscous, it is very possible that no oil film will be formed. It is claimed, however, that with a velocity as low as ten feet per minute oil is drawn into the bearing of the journal and forms a wedge. This wedge of oil forces the shaft over and raises it, completely separating it from the bearing. As the velocity increases, the thickness of the oil film becomes more uniform and the center of the shaft approaches more closely to the center of the bearing. If the load be now increased, as the speed is kept constant, the journal tends to approach a point on the bearing about 40 degrees from the vertical. If a further increase in load be applied the oil film will be ruptured with resultant friction, hot bearings, wear, and possible breakdown of the unit.

Oxidation

It has been explained how the lubricating oil in a pressure circulation system enters the bearings and assists in the formation of a wedge-shaped oil film. Upon its escape from the ends of the bearings it is thrown violently about in the crankcase and broken up into fine spray due to the action of the revolving crankshaft. This fine oil spray coming in contact with the hot air in the crankcase is subjected to an oxidizing effect, especially in the presence of water and other impurities. This oxidation, accelerated by the constant churning effect, promotes emulsion and has a very detrimental effect on lubricating oil. Careful selection of the crudes from which the oil is manufactured and equal care and skill in its refining will produce a high grade lubricating oil suitable for this service.

Detrimental Factors

Impurities which may contaminate the lubricant may be caused by water leakage from the cooling system or deposits from lubricating oil, fuel oil, or dust contained in intake air. These may reach the lubricating oil in the crankcase in the form of cylinder drip.

In engines where lubricating oil is used for cooling the pistons, the discharge from the piston head is sometimes led directly to the crank pit, allowing the piston cooling oil to mix with the bearing oil. This oil, in its circulation through the pistons, has naturally come in contact with the very hot inner wall of the piston head, The oil must be able to resist to the greatest extent any tendency toward breakdown when exposed to this high temperature. The formation of carbon deposits on the inside of the pistons will retard the transmission of heat from the piston to the circulating oil whereby the setting up of excessive heat stresses may result in cracked pistons.

It can be readily appreciated that the severe service conditions of bearing oil in a diesel engine lubricating system will result in breakdown of inferior or unsuitable products. This is usually manifested in the precipitation of gummy deposits, although these are not always easily detected and the oil may still appear to be in fairly good physical condition. These gummy deposits are most dangerous when they lodge within the oil pipes leading to the bearings, or the oil ducts within the crankshaft, or the connecting rod. The accumulation of such deposits may not be observed until there is a sudden restriction or stoppage of oil to some bearing or group of bearings with resultant burned out bearings and possible serious consequences.

Bearing Wear

The evil and undesirable consequences of excessive bearing wear may be even more serious than those of excessive cylinder wear. It is impossible for metal surfaces under pressure, such as journals and bearings, to rub one on another even for short periods without generating heat which will quickly become excessive and eventually destroy the material. Such surfaces must be positively separated by a film of lubricating oil. While cylinder wear, in extreme cases, leads to loss in compression, and consequent loss in power, excessive main bearing wear in addition to loss in power may also lead to fracture of the crankshaft. Bearing troubles are not always apparent or audible. Where the load on a bearing is always in one direction, quite a bit of wear may exist without any audible signs.

The resistance of an oil film to squeezing action is dependent on the body or viscosity of the lubricating oil, the size of the engine bearings, the speed, the unit pressure, and the temperature of the oil.

Under conditions of starting, or in the case of slow movement as with piston pin oscillation or crosshead bearings, the formation of an oil wedge and maintenance of an oil film are effected, and there is a tendency of the oil film to be squeezed out of the pressure area. Viscous or heavy oils are therefore used where the bearing pressures are high, the clearances large, or the temperature of operation high. Of course, if too heavy an oil be selected for a certain service the fluid friction and the consequent bearing temperature will become excessive, and the separation from inevitable impurities within an oiling system is made difficult.

It is necessary to use a thin oil where high speed bearings are employed because it gives the minimum of friction, and because the friction generated by the high rubbing speed of the journal would be abnormally increased by the use of a heavy oil. In high speed bearings the bearing pressure is usually light, which permits a thin oil. However, if too light an oil is used, the lubricating film is not sufficiently viscous to keep the metal surfaces apart. This will readily cause rapid wear and result in burned-out bearings. As such an oil is readily atomized on escaping from the bearings, the spray thus formed in intimate contact with air promotes oxidation. Excessive lubricating oil consumption may also result from the use of too light an oil according to the engine design, operating conditions, and opportunities for oil leakage.

Frictional Resistance

Probably the principal reason why the lubrication efficiency of oil is not given more general attention is because a great proportion of the losses incurred through faulty lubrication is hidden. As long as an oil is not giving any unusual or flagrant trouble it is often assumed that it is efficient, while as a matter of fact the use of an improper lubricant may be causing a heavy power load factor.

A condition met with in lubrication that does not seem to be fully apparent to the average user of oils is that frequently there are chemical or physical imperfections in the metals of the bearings or journals, or some mechanical defects in the fitting of these parts that are not discernible by the naked eye. Yet tests have clearly indicated that excess friction and correspondingly high temperatures can be, and often are, caused by variations in the smoothness of the bearing or journal surfaces that cannot be easily detected.

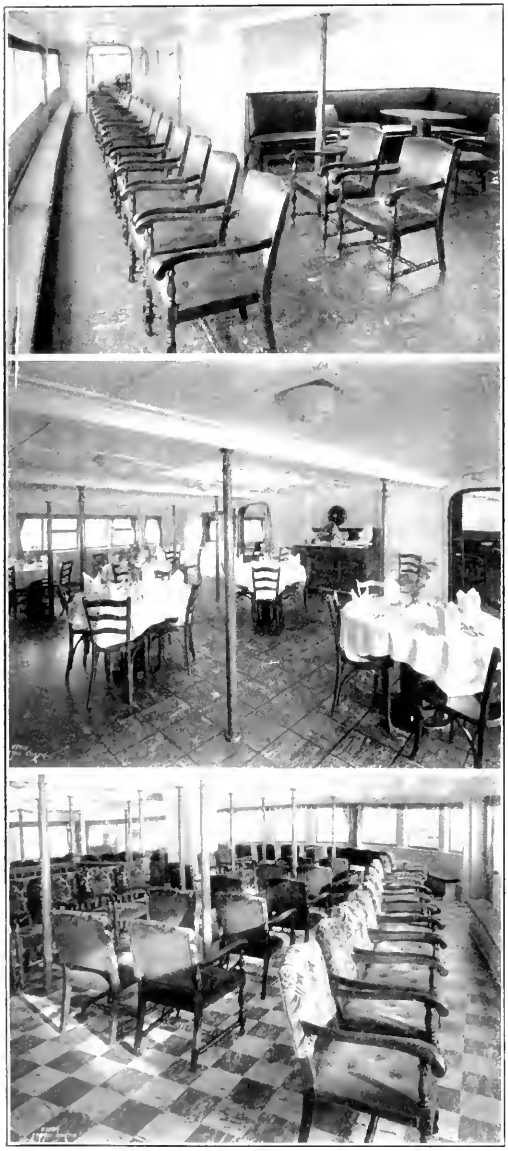
All surfaces are more or less rough; even surfaces which are well machined and polished show under the microscope small projections and depressions. It is the interlocking of these minute projections which causes solid friction when two surfaces are pressed together and move relative to one another without lubrication.

The object of all lubrication is that the lubricant should attach itself to the rubbing surfaces and form a film between them which, under the conditions of speed, pressure, and temperature prevailing, will not be squeezed out, but will keep the frictional surfaces apart. In perfectly lubricated bearings the rubbing surfaces never actually touch one another and the friction is entirely dependent on the lubrication. The frictional resistance with fluid friction is dependent upon the speed and area of the rubbing surfaces and the viscosity of the lubricant at the working temperature of the oil film, but is independent of the pressure between surfaces, the condition of the rubbing surfaces, and the materials of which they are composed.

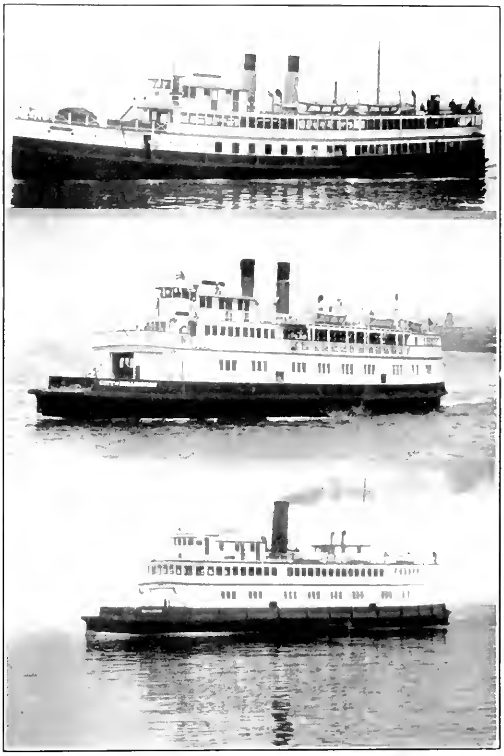
When an engine has been idle for some time the oil films on the various working parts have become more or less completely dissipated. The sustained pressure, due to the weight of the parts has caused the oil films to be squeezed out, with the development of a certain amount of metallic contact. This results in a considerable starting effort of an engine and the static coefficient of friction approaches that of solid friction. The starting effort will, of course, depend on the conditions and nature of the surfaces in contact and the pressure between them.

Just as the surfaces begin to move the kinetic coefficient of friction comes into play; but as the speed increases an oil film is formed and the kinetic and solid friction decreases until perfect film formation is attained. The high values of the static coefficient easily explain the great effort often required to start an engine from rest; therefore, the introduction of ball or roller bearings, where there is practically no difference between the static and kinetic coefficients, would be advantageous.

The Evolution of a Puget Sound Ferry



Three interior views showing the modern, comfortable furnishing and equipment that are characteristic of Puget Sound ferries. Note the beautiful effects obtained by the use of Goodyear Rubber Tiling for deck coverings.



Three views of the same ship. Top: Kitsap II, in 1906; middle: City of Bellingham, 1920; lower: Quilcene, 1931.

ON January 15 the Lake Washington Shipyards delivered to the Puget Sound Navigation Company a trim, fast, de luxe passenger and auto ferry, the Quilcene, ex-City of Bellingham, ex-Kitsap II. She was built in 1906 as a passenger vessel, converted to a passenger and auto ferry in 1920, and now has been again enlarged in capacity and equipped to meet modern Pacific Coast standards.

The Quilcene is 156 feet long, 43 feet beam, by 13 feet depth. She has space for 40 automobiles on the main deck and is fitted with a turn-table aft for turning cars for head-on landings.

On the upper deck there is a large glassed-in observation room forward, a smoking and card room, lavatories, a nice dining room, and a completely equipped galley. Seating accommodation is provided for 225 persons in comfortable upholstered chairs, all facing the water. Goodyear rubber tiling in pleasing combinations of colors and patterns covers the deck. Bulkheads and ceilings are in 3 and 5-ply laminated wood paneling. Indirect lighting is used with a very pleasing effect. The galley is equipped with a new oil-burning range and with a large capacity Frigidaire cabinet. A new 15-kilowatt General-Electric generating set was installed to carry the extra lighting and auxiliary power load. A special radio receiving set serves loud speakers in the observation and the smoking rooms.

Marine Equipment

EXHAUST TURBINES ∾ DIESEL TRAWLER
PATROL BOATS ∾ SEAM COMPOUND

More Speed and Less Fuel

Performance Data for First Year of Steamship Lena Luckenbach with Exhaust Turbine

THE steamer Lena Luckenbach of the Luckenbach Steamship Company, Inc., New York, which was fitted with an American Bauer-Wach exhaust turbine, has now, with entire satisfaction to the owners, run for over a year with the new equipment, and the records of two years' performance, before and after conversion, respectively, are now available for comparison.

Bauer-Wach exhaust turbine unit being hoisted aboard the steamship Lena S. Luckenbach.

About one knot in speed has been gained, which works out as a saving of 3½ days for a round trip; and, as practically six round trips are made per year, totaling approximately 60,000 miles, twenty sea days are saved, leaving more time in port for loading and unloading cargo and in reducing or eliminating over-time work. There is also an annual saving of 5400 barrels of fuel oil.

This vessel, built in Japan in 1920, is of 10,600 deadweight tons, and was originally equipped with three Scotch boilers and a triple expansion engine having 27½ x 45 x 75-inch cylinders and 51-inch stroke, and giving 2800 indicated horsepower and 10½ knots speed. By the installation of a Contrapropeller and other improvements this was subsequently, but prior to the installation of the exhaust turbine, brought up to about 11½ knots at 74 revolutions per minute.

The exhaust turbines and gears were supplied by the American Bauer-Wach Corporation, 11 Broadway, New York City, and were installed at the Boston plant of the Bethlehem Shipbuilding Corp., Ltd., the condensing plant being altered and a new circulating pump being installed at the same time to supply higher vacuum. After successful dock and sea trials the vessel made a trip from Boston to Philadelphia, and left New York on November 30, 1929, for the Pacific Coast, since which time she has been engaged in the intercoastal trade.

With approximately the same conditions of draft as in the previous year and with the average amount of adverse weather, she has maintained an average speed of 12.6 knots on all of her long runs, using the same amount of steam as formerly. On many of the long runs in ordinary weather, the speed has averaged over 13 knots and, at times, as high as 13.9 knots. The average consumption of fuel oil per knot is now 0.908 barrel as against 0.927 barrel with engines alone. The improvement of propulsive power in this vessel qualifies her for a mail contract speed of 13 knots in ordinary weather.

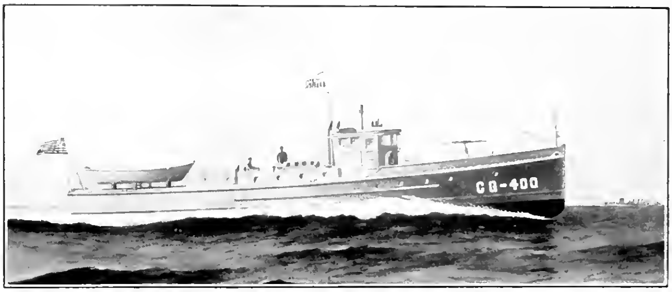
The contract under which the turbine was installed stipulated that the power would be increased from 2800 to 3500 indicated horsepower on the same steam consumption. The estimates were fully proved in actual service. Indicator cards taken off the reciprocating engine with the turbine connected show an average output of 2623 indicated horsepower at 81 revolutions per minute, corresponding to over 3500 combined equivalent indicated horsepower.

Although the engine runs six or seven revolutions faster when using the turbine, the maximum torque variation on the propeller shaft is actually less than formerly, due to the fly-wheel effect of the turbine and because of the absorption of jars and shocks by the fluid coupling between the engine and the turbine gears. The absence of vibration in the engine, and also in the vessel, is very noticeable, and the wear on bearings and journals has been found to be less since installing the turbine.

Marine Condenser Developments.—Bulletin D.M.F. 5258—has been issued by Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania. The equipment covers condensers, both single and two-pass, propeller-type circulating pumps, and air ejectors.

Patrol Boats for America and Europe

SIX years ago, when the U. S. Coast Guard was charged with the enforcement of the Prohibition Act, a fleet of 75-foot patrol boats was built and, while these boats are frequently credited with seizures of important rum runners, they serve likewise to stop alien smuggling and the smuggling of narcotics; and these last duties are not the least of their effort. The 75-footers have rescued many boats at sea; they have been a real benefit to yachtsmen in many cases. It is a tough life aboard these boats, far out to sea on patrol duty in the winter months. Yachts that are hailed by a Coast Guard boat should accept the command promptly, considering that the officer in charge is on sworn duty and any attempt at evasion must be met by him with a determined effort to capture.

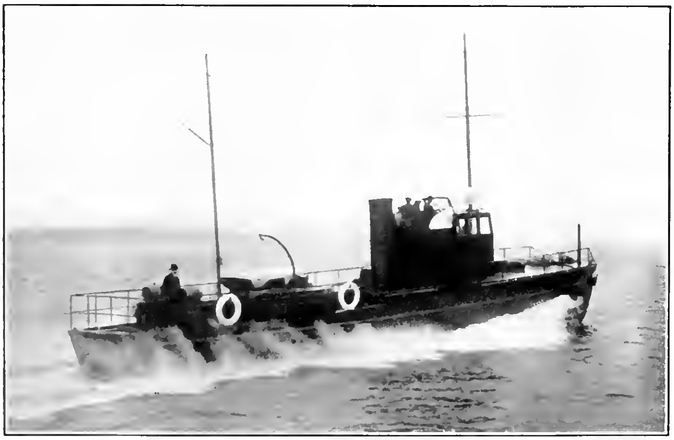


One of the United States Coast Guard inshore patrol boats, designed by Eldredge-McInnis and built by The Southern Shipyard Corporation, Newport News, Virginia. 78ft. long and powered with two Sterling-Viking II 8-cylinder engines, these boats make a speed of 25 miles an hour.

In six years of service, these Coast Guard 75-footers are said to have averaged 30,000 miles per year, which is equivalent to 180,000 miles per boat to date. Of course, the machinery has been serviced in this time, but it certainly was entitled to attention.

The newest addition to the U. S. Coast Guard fleet will be six patrol boats, 78-footers, designed by Eldredge and McInnis, and now being built at the Southern Shipyard Corporation. These boats, like the 75-foot boats, carry a one pounder forward and operate on similar duties. While the 75-footers are equipped with twin Sterling Coast Guard 225-horsepower, 1200 revolutions per minute engines, the new 78-foot boats are being furnished with twin Sterling Viking II 8-cylinder engines rated 565 horsepower at 1200 revolutions, and, of course, carrying this additional power, will be considerably faster. The speed is 25 miles per hour. These boats have a long cruising radius in consideration of their speed, and are probably destined for duty in the offshore patrol, which lies in wait for the rum runners coming down from the Canadian coast.

There are many Russian patrol boats, usually built in Finland. These 72-foot cutters are equipped with twin Sterling Dolphin 8-cylinder engines of 225 horsepower, 1550 revolutions per minute, and are rated at 29 miles an hour. Turkey has had built by Lurssen of Germany, a number of 72-footers equipped with twin Sterling Coast Guard 225 horsepower engines, that have a speed of 20 miles an hour. These various boats are designed with different characteristics, depending on the waters in which they operate, and necessarily these conditions affect the speed. In some cases the boats are light and very fast, and in other cases they operate in rough water and speed is sacrificed for the ability to cruise at sea.


One of the new 72-ft. Coast Guard cutters recently built by A. B. Abo Batvarf of Finland for the Soviet government. These boats are driven by two Dolphin, 8-cylinder, Sterling engines at a speed of 29 miles an hour.

These boats usually employ their engines at about 1200 revolutions maximum. The Russian boats, however, use a top speed of 1500 revolutions. Sterling engines are all built with dual valves in the head and with counter-weighted and dynamically balanced crankshafts. A patented Sterling piston is used that has no split in the skirt and no struts to connect with the piston pin. Expansion is controlled without affecting the contour of the piston or its bearing upon the cylinder walls. The two smaller sizes of Sterling engines mentioned herein have been available for years; the new Viking size is a more recent development.

Sturtevant Filticooler.—A booklet dealing with its new Filticooler has just been received from the B. F. Sturtevant Company of Hyde Park, Boston. This is a product for washing, filtering, and cooling air; it is manufactured in units.

A Trawler That Never Turns Back

A LITTLE more than two years ago, A. Paladini, Inc., pioneer fishing and fish marketing firm of San Francisco, took delivery from the General Engineering and Dry Dock Company of a new, modern trawler, the Catherine Paladini. At that time Pacific Marine Review published an illustrated description of this vessel under the title "An Ideal Fishing Boat." During the two years of her working history, the Catherine Paladini has lived up to that title in every respect.

The offshore trawler fleet out of San Francisco Bay is operated by the Northern California Fisheries, a corporation owned jointly by A. Paladini, Inc., the San Francisco International Fish Company, F. E. Booth Company, and the Western California Fish Company. This corporation operates 18 offshore trawlers; and the Catherine Paladini is the queen and leader of this fleet. The fleet operates off the northern California coast, basing at various ports, as the fishing demands, from Monterey to Eureka. The operations therefore cover about 500 miles of open sea off a rather treacherous coast line. Under these conditions, the Catherine Paladini, as leader and largest of the fleet, is constantly in demand for service under all sorts of weather conditions; and the statement of her owners in this connection is "She has never turned back yet."

To those familiar with the weather and sea conditions involved, this terse phrase will speak volumes for the strength of the hull, the stamina of the power plant, and the endurance of the officers and crew of this stout craft.

The Catherine Paladini is 78 feet long, 18 feet 6 inches beam, and 6 feet 6 inches molded depth. She has comfortable accommodations for crew and fishermen and is equipped with all the necessary electric light and electrically powered appliances to efficiently carry on her trawling work. Her propulsion plant consists of a 200-horsepower Atlas-Imperial diesel engine. This engine has functioned perfectly in practically continuous operation for over two years. During that time expense of maintenance and repair has been nominal.

Year in and year out, idling over the trawl or bucking a hard Northwester to make port with a big cargo of fish, Catherine Paladini and her Atlas power plant have "never laid down on the job."

A New Type of Oil Engine

AFTER many laboratory and practical tests, Murray and Tregurtha, Inc., of North Quincy, Massachusetts, have announced a new type oil engine. This firm is a pioneer manufacturer of gasoline engines and their product in that line has been favorably known since 1891.

The new M. O.-type Murray & Tregurtha engine vaporizes the oil and explodes the resultant vapor in the cylinders in the same manner as a gasoline engine. The fuel (diesel oil or heavy distillate) is mechanically processed by a Shore "nebulizer," which delivers a practically dry mixture of vapor and air to the engine cylinders. This charge is drawn in on the suction stroke and is ignited after the compression stroke by an electric spark.

Part of the exhaust heat is used to prevent condensation of the vapor in the manifold between the "nebulizer" and the cylinders. Operation conditions are obtained equal to those prevailing under the best standard carburetion in gasoline engines; and the cost of operation is claimed to be about one-half that for a good gasoline engine. The exhaust is clear and free from smoke, sparks, odor or smudge.

The nebulizer is cylindrical in shape, is mounted on the side of the engine, and is driven by gears. It has but three moving parts, none of which requires adjustment. In all other features the engine is a conservatively designed marine gas engine.

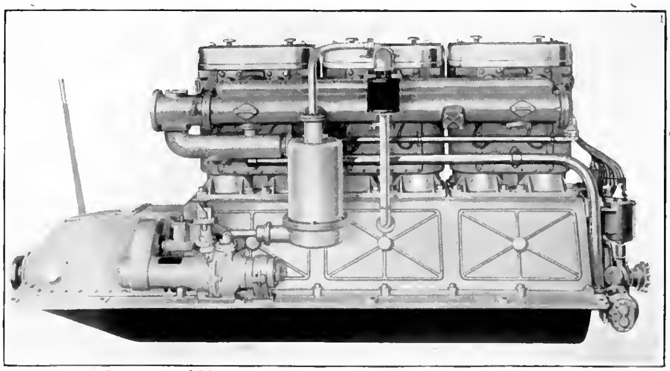
A 36-foot cruiser has for nearly a year been successfully operating with one of these oil engines. A 62-foot boat with an M. O. engine has recently been placed in service. Another commercial installation has been operating satisfactorily for six months.

The M. O. engine is now available in 4 cylinder, 65 horsepower, and 6 cylinder, 110 horsepower models that actually deliver 75 and 127 brake horsepower respectively at 800 revolutions per minute.

Sales and service representatives are being appointed throughout the United States to handle this engine in their respective districts.

Trade Literature

Power Pumps.—The Worthington Pump and Machinery Corporation, 2 Park Avenue, New York, N. Y., has recently published a very comprehensive bulletin covering Vertical Triplex Power Pumps, single acting. The catalog contains 43 pages and goes into considerable detail in presenting the pump and expounding on the superior quality of its separate parts. There are numerous photographs, diagrams, and tables to illustrate the text matter.



The new M.O. 6 type of Murray and Tregurtha oil engine with the Shore Nebulizer.

New Seam-Sealing Compound

A NEW seam compound that is reputed to be all that a good seam seal should be makes its bow to the boating industry and public January 1931. L. W. Ferdinand Co., of Boston, is sponsor and originator. Since 1871 this firm, then an old ship chandlery concern, has been the United States representative of Jeffery's Marine Glues. As specialists in marine products for the last sixty years, it has had its finger on the pulse of the boating industry at all times.

Boating has taken seven league strides of progress during the last few years, bringing new problems in building and accessories. The desire for speed has brought demand for higher powered motors installed on boats of lighter construction. These demands bring about a new set of problems for the manufacturer of materials guaranteed to seal the seams of a wooden boat tight against leakage. With greater water pressure on the outside and less surface in the seam, a super-sealing material was required. This material had to maintain its super-sealing qualities under great variations of temperature, moisture, and strain from weaving of the structure. A product had to be made that would be resilient eternally, yet be tough. One that had to be sticky, yet not adhere to a knife blade in applying. It had to harden on the surface so that its oils and ingredients would not bleed through paint, yet in its body it must be tenacious, and never under any conditions of climate or weather or time harden to the brittling point. In a word the perfect seam compound had to be easy to apply, resilient, tenacious, tough, nonbleeding, long-lived, waterproof, and last but not least, it had to be economical.

L. W. Ferdinand & Co. is staking its prestige as specialists in waterproof adhesives on the absolutely perfect score of its new-born seam compound Ferdico Seamseal.

Alloy-Lined Steel Tubing

A NEW method of lining steel tubing with a variety of metals or alloys to accomplish results never heretofore possible has just been announced by the Detroit Seamless Steel Tubes Company, which has secured exclusive patent rights to the process.

Of particular importance in the application of this new process to industrial uses is the fact that in combining the inner lining metal with the outer steel shell the two are bonded by fusion so inseparably that there is not only no evidence of separation, but no manual means of destroying the union. In fact, turnings made from the end of a tube so lined will curl off the tool so integrally united that the spiral formed shows both textures of the bonded metals as one continuous strip without fracture at any point between the two.

Further demonstrations of the completeness of fusion have been obtained, in cases where the linings were of malleable metals, by splitting and rolling the finished tubes into flat sheets which still retained their respective layers in proper comparative thicknesses, inseparably bonded together. In other tests the combination has been manipulated or worked into various forms, even to the extent of turning it "wrong side out" without destroying the union in any way.

The greatest industrial possibilities of the process, according to C. H. Hobbs, president of the Detroit Seamless Steel Tubes Company, are undoubtedly to be realized through its exceptional advantages in the production of steel-backed bearings. The fact that any specified thickness of the bearing metal can be accurately controlled, and the further fact that tubes in lengths as great as 16 feet, or even longer, can be fabricated with maximum economy, particularly recommends the process for quantity production of bearings.

Manufacturers with proper shop equipment can stock the lined tubes in lengths ready for their screw machine departments and thus be enabled to readily produce bearings of varying lengths but with the same outside and inside diameters from one length of tubing. Through this manner of handling, manufacturers will be in a position to cut down their finished stock to the minimum.

One of the important advantages accredited to this process is the superiority of the texture of the lining metal, obtainable because it is cast into the tubing by a centrifugal process. Bearing metal, regardless of its composition, is much superior when cast in this manner, according to Walter Brown, of the Brown Alloy Works, Toledo, Ohio, inventor and patentee of the process, because it possesses far greater density and homogeneity than when cast in sand molds.

Referring to still another phase of its adaptation to bearing manufacture it is pointed out that numerous manufacturers of electric motors have discontinued the use of solid bronze bearings because of the difference in expansion and contraction between the bearing metal and steel shaft under operation. Using a steel-backed bearing produced by the Brown method, this difficulty will be eliminated. The shell being of steel and the bearing metal a thinner layer of bronze, the bushing will expand in the same proportion as the steel shaft and thus maintain at all temperatures the proper bearing clearance.

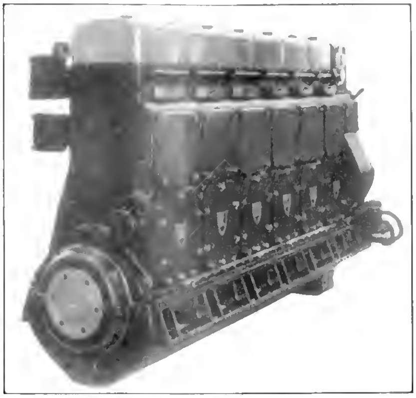
Among the lining materials already successfully used are bronze, copper, tin—in fact almost any nonferrous or alloy metal. Practically every kind of bearing bronze can be used. This fact makes practicable many other uses, such as tubes lined with noncorrosive metals for conveying liquids whose chemical properties deteriorate steel, tubes used in water-tube boilers where a lining metal of high heat conductivity is advantageous, and water pipes to displace tubes of copper or other material where strength is a desirable factor.

Trade Literature

Turbine-Generator Units.—Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvannia, has ready for distribution Circular 1835-A, a 12-page bulletin, describing the 3600 revolutions per minute, steam turbine-generator units, with many illustrations showing the design and construction of all parts of the turbine and the generators.

Oldest Builder—Newest Engines

I. P. Morris and De La Vergne, Incorporated, after careful study and many experiments, are now introducing to the American diesel engine market two new types of diesel engines. One of these is a directly reversible marine engine, 17-inch bore and 24-inch stroke, developing 140 horsepower per cylinder at 300 revolutions per minute. The other is a high-speed non-reversible engine, 9-inch bore and 11-inch stroke, developing 50 horsepower per cylinder at 750 revolutions per minute. Both engines are of the solid injection, 4-cycle type, with individual fuel pumps for each cylinder.

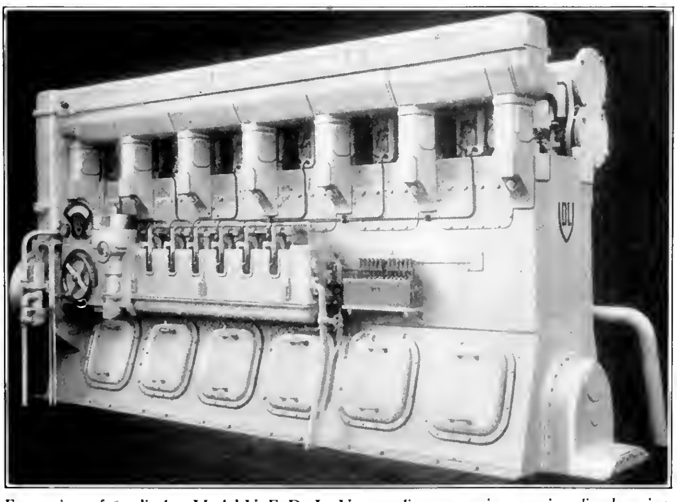


6-cylinder Model V.H. De La Vergne diesel engine, 300 horsepower at 750 R.P.M.; net weight 10,000 pounds.

Reversible Marine Type Engine

Although De La Vergne is the oldest manufacturer of oil engines in America, they have never, until the development of this new unit, made an engine especially designed for marine service. Some marine installations have been made, but always with the De La Vergne stationary type operating either an electric transmission to the propeller shaft or a hydraulic transmission. The new De La Vergne heavy duty, marine engine is a fully reversible type of a simple, symmetrical, pleasing design, entirely enclosed, no moving parts being exposed except the fuel oil pumps and the cylinder lubricators.

We illustrate herewith the first of these new engines which is a 6-cylinder model rated 850 brake horsepower at 300 revolutions per minute. The entire frame of the engine, including cylinder block, cylinder jackets and crank case, is cast en bloc, forming a very rugged girder. The bed plate is of deep box section with strong cross girders supporting each bearing. Through tie rods of alloy steel take the stresses and hold the cast iron frame and the bed plate under compression.



Front view of 6-cylinder, Model V. F. De La Vergne direct-reversing, marine diesel engine; 850 brake horsepower at 300 R.P.M.; net weight 90,000 pounds.

All the details of the operating and controlling mechanism of this engine are designed and manufactured along conservative diesel engineering lines with ample margins of safety and with assurance of efficiency and low maintenance costs.

Pressure lubrication forces oil to all working parts and oil is fed to the cylinders by a Manzel force feed lubricator. The patented De La Vergne injection system is retained with solid injection. This combination insures clean combustion and burns boiler fuel without difficulty.

This 6-cylinder, 850-horsepower unit is 17 feet 5½ inches long, 5 feet broad at the base, and 12 feet 4 inches high, requiring 14 feet 7 inches clear height above the base for the drawing of pistons. It has a net weight of 90,000 pounds. The control—starting, stopping, reversing—is all performed by a single handwheel. The engine is compact, sturdy, dependable, economical, and remarkably smooth and silent in operation.

The High Speed Model

There has also been tested and put into production by this firm a lightweight, highspeed, high capacity diesel engine with 9 by 11 inch cylinders rated 50 horsepower at 750 revolutions per minute. We illustrate the 6-cylinder, 300-horsepower unit of this type, which has a net weight of 10,000 pounds.

This engine is fitted with aluminum pistons, solid injection, with Robert Bosch injection valves and fuel pumps (individual). Cylinder heads are each fitted with two intake and two exhaust valves. This system, with carefully designed combustion space and piston crown, enables the manufacturers to quote D.E.M.A fuel consumption rates of 0.40, 0.41, and 0.44 pound per brake horsepower at full load, three-quarters, and half load respectively.

The compression pressure is 420 pounds, the brake mean effective 75.5 pounds, and the piston speed 1375 feet per minute. Completely enclosed with forced lubrication to every bearing, the design gives a remarkably compact unit with no sacrifice of conservative figures in bearing pressures or material stresses. The 300-horsepower unit illustrated is 9 feet 4½ inches long, 68¾ inches high, and 32½ inches wide.

An Interesting Dock Capstan

Pelton water wheel driven Hyde dock capstan specially designed for use on oil wharf at Richmond, California.

THERE has recently been installed on the oil loading dock of the Standard Oil Company (Calif.) at Richmond, California, a Hyde capstan driven by a Pelton 15-horsepower water-wheel. This is a very good combination in locations where there is special fire hazard and where water under pressure is available.

As shown in the illustration, the capstan and water-wheel are mounted on a welded structural steel base that ties them together in a rigid compact unit. The water-wheel works directly off the fire mains which are kept at 100 pounds pressure. This gives the wheel a speed of 800 revolutions a minute and the capstan a rope speed of 25 feet per minute, with a rope pull of 8000 pounds. The reduction gearing, the worm and the worm-wheel run in an oil bath.

This installation was designed by C. V. Lane, California distributor for the Hyde Windlass Company of Bath, Maine, in cooperation with the engineers of the Pelton Water Wheel Company of San Francisco, and is available in sizes and capacities to meet commercial requirements. The control for the wheel nozzles and the stop valve on the water supply are so located that both are easily reached by a man handling the rope of the capstan.

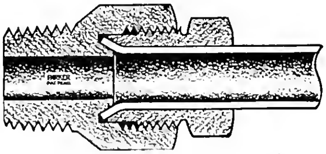
The unit is in satisfactory operation, giving very good service at a very busy dock.

Copper Tubing Aboard Ship

ON shipboard, particularly on board modern steamers and motor-ships, there is an increasing demand for copper tubing for various classes of pipe service. For heat transfer apparatus it is in a class by itself. It lends itself readily to self-contained expansion bends. It is very little affected by corrosion.

The Parker Appliance Company of Cleveland, Ohio, after long experience in the development of copper tube plumbing and copper tube use in power plants, developed the Parker tube coupling, which is a fitting of rugged construction and balanced design that functions perfectly for tight joints in copper tubing.

As will be noted in the illustration, this coupling permits full flow—there is no restriction of passage. The nut serves as a die for the flaring of the tube thus insuring perfect seating and a tight joint. The strongest part of the tube is at the connection where strength is most needed and that portion of the tube adjacent to the connection is entirely surrounded and strongly supported by the nut.



Cross-section of Parker tube coupling.

These couplings are manufactured to very close tolerances. The design allows ample hexagons, wrench pads, and beads, insuring structural strength and long life. It is claimed that this coupling is only half the length of any other giving equal tube support. This, of course, means half the bulk and half the weight, two very prime considerations aboard ship, either at sea or in the air.

Parker tube couplings give assurance of perfect metal-to-metal joints, fuel- and oil-tight, and remarkably resistant to vibrational and other strains.

Albert M. Schweitzer of San Francisco distributes this product to the marine trade.

Protection for High Pressure Boilers

THE use of modern, high pressure, high temperature, steam propulsion machinery at sea brings to the ship operator some very welcome economies in fuel used and in weight and space occupied. It also brings to the operating engineer an added responsibility for maintaining all machinery, piping, valves, and particularly all the water-tube boilers in prime effective condition. It is especially important that detrimental impurities be kept out of the boiler feed. One of the worst enemies to the boiler tube under modern conditions is oil in the feed water.

In order to guard against the possibility of any quantity of oil entering the steam side of the boilers, the Matson Navigation Company has ordered six pressure type Short alarm service tanks for installation in connection with the fuel oil heaters on the steamers Monterey, Mariposa, and Lurline, the three passenger liners now building for the San Francisco-Australasia service of the Oceanic Line at the Fore River Plant of the Bethlehem Shipbuilding Corp., Ltd.

The steam drain from the fuel oil heaters will be led directly to these tanks. Should there be any oil leakage from the coils of the oil heaters, it will immediately affect the position of the float in the alarm tank and close the electrical control circuit, thereby ringing a gong on the instrument board at the operating engineer's station. This gong will continue to ring until the oil is discharged to the bilges and the offending heater is cut out for inspection and repair.

The Short alarm tanks used on these ships are to be 22 inches in diameter and 42 inches high and are to be fitted with a 25-pound relief valve and an air ejector valve. This device has been thoroughly tested in service and is giving an excellent account of itself. It was designed and patented by a San Franciscan and is manufactured in San Francisco. C. V. Lane is Pacific Coast distributor.

Progress of the Isherwood System

Year	Number of Ships built or under Construction	Deadweight Carrying Capacity
Sept. 1907 to 1908	6	31,608 tons.
1909	36	212,922 "
1910	76	484,752 "
1911	140	958,795 "
1912	240	1,777,348 "
1913	270	1,993,034 "
1914	311	2,351,322 "
1915	468	3,548,221 "
1916	620	4,668,000 "
1917	800	6,332,150 "
1918	1,050	8,707,700 "
1919	1,260	10,594,700 "
1920	1,395	11,962,400 "
1921	1,418	12,032,400 "
1922	1,431	12,101,890 "
1923	1,443	12,174,490 "
1924	1,472	12,408,700 "
1925	1,502	12,649,730 "
1926	1,551	13,095,480 "
1927	1,618	13,491,380 "
1928	1,653	13,752,920 "
1929	1,779	14,936,900 Tons
1930	1,827	15,357,450 "

NAME	DIMENSIONS	D.W. CARRYING CAPACITY
"G. HARRISON SMITH"	525'-0" x 74'-0" x 40'-6"	20,600 Tons
"W. S. FARISH"	- do -	20,600 "
"SIR JAMES CLARK ROSS"	535'-0" x 74'-0" x 48'-9"	18,000 "
"BRILLIANT"	480'-0" x 65'-9" x 37'-0"	14,800 "
"CHESTER SUN"	- do -	14,750 "
"COMET"	- do -	14,800 "
"DAYLIGHT"	- do -	14,800 "
"EASTERN SUN"	- do -	14,750 "
"PACIFIC SUN"	- do -	14,750 "
"TIDEWATER"	- do -	14,760 "
"TIDEWATER ASSOCIATED"	- do -	14,760 "
"WESTERN SUN"	- do -	14,750 "
"CAPELLA"	474'-0" x 64'-0" x 37'-0"	13,500 "
"CHEYENNE"	470'-0" x 63'-6" x 34'-9"	12,000 Tons
"APPALACHEE"	- do -	12,000 "
"HARRY F. SINCLAIR"	431'-0" x 57'-0" x 34'-0"	10,000 "
"VIRGINIA SINCLAIR"	- do -	10,000 "
"PEGASUS"	480'-0" x 64'-9" x 36'-9"	13,500 "
"MINISTER WEDEL"	415'-0" x 57'-8½" x 33'-0"	9,400 "
"IMA"	- do -	9,400 "
"SETH"	- do -	9,400 "
"KATY"	- do -	9,400 "
"PETER HURLL"	520'-0" x 70'-0" x 38'-9"	16,200 "
"F. H. BEDFORD JR"	- do -	16,200 "
"HEINRICH V. RIEDEMANN"	- do -	16,200 "
"J. A. MOWINCKEL"	- do -	16,200 "
"J. H. SENIOR"	- do -	16,200 "
"HARRY O. SEIDEL"	512'-0" x 67'-11" x 38'-5"	13,600 "
"SELJE"	465'-0" x 59'-0" x 31'-5"	12,000 "

SIR Joseph W. Isherwood & Co., Ltd, as shown in tabulation on this page, continues to maintain the position attained by the merit of the "Isherwood" system of construction; and the combination of expertness in design, practical experience and good service have earned for the company a large clientele amongst shipbuilders and shipowners. The more important of the Isherwood ships completed in 1930 are listed herewith.

Referring to the list, the G. Harrison Smith and W. S. Farish, built by the Federal Shipbuilding & Dry Dock Co. of Kearny, New Jersey, for the Standard Shipping Company, are undoubtedly two of the finest tankers of the year and are fitted with high-pressure, double-reduction, De Laval turbines developing 4400 shaft horsepower at 75 revolutions per minute, two water-tube boilers of 5080 square feet heating surface in each, designed for 400 pounds working pressure, steam superheated to 750 degrees Fahrenheit, and electrically driven rotary cargo pump.

The nine 480-foot tankers included in the list are built by the Sun Shipbuilding Company of Chester, Pennsylvania, all fitted with Sun-Doxford type engines of 2800 shaft horsepower built and installed by the builders, and an interesting fact worth recording is that these vessels form part of a large program of similar tankers ordered from the same builders for the Motor Tankship Corporation, the Standard Transportation Co., and the Tidewater Oil Co., respectively.

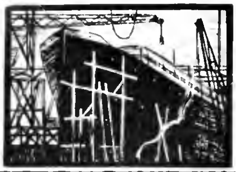
With the exception of the Selje, which was built for the exceptionally hard service of carrying iron ore, the balance of these vessels are tankers and all with the exception of two, have been built on the Bracketless-System, the two exceptions being the Cheyenne and Appalachee, which were specially designed.

Important amongst the 1930 Isherwood contracts are five more 480-foot oil tankers placed with Sun Shipbuilding Company; one 10,000 and one 13,000-ton tanker with Burmeister & Wain; a repeat order to Kockums Mek. Verkstads of Malmo, for a 12,500-ton tanker; a repeat order to the Cantieri Riuniti Dell-Adriatico of Monfalcone for a tanker of 11,000 tons for Norwegian owners; nine large oil tankers each of 16,200 tons deadweight carrying capacity placed by the Standard Shipping Company, three to be built by Cantieri Riuniti Dell'Adriatico of Monfalcone, two by Bremer Vulkan Schiffbau und Maschinenfabrik, of Vegesack, two by Fried Krupp Germaniawerft of Kiel, and two by Deutsche Werft of Hamburg, and a number of 10,000-ton tankers for The British Tanker Co. Ltd.

The Isherwood System is suitable and advantageous for all types as is evidenced by the following analysis of the Isherwood ships now in operation.

Oil Tankers—988 aggregating 9,219,960 tons deadweight carrying capacity.

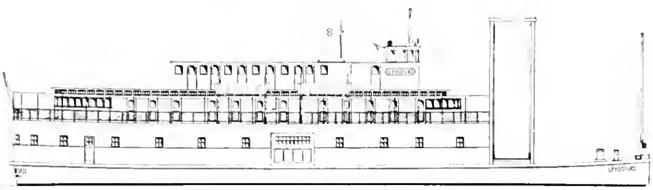
Passenger liners, general cargo vessels, colliers, ore steamers, Great Lakes freighters, passenger and freight ferry vessels, and barges, dredgers, etc.—839, aggregating 6,137,500 tons deadweight carrying capacity.



American Shipbuilding

Edited by H. C. McKinnon

New Type River Motorship



The Albina Engine & Machine Works, Portland, Oregon, is building an interesting craft for service on the Columbia River. This is the L. P. Hosford, a shallow draft, high speed, express passenger and freight motorship for operation on the Columbia and Williamette Rivers for the Harkins Transportation Company of Portland, Oregon, of which L. P. Hosford is president and manager.

The vessel is to be 160 ft. long, 30 ft. beam, and 10 ft. 6 in. depth of hold midship. Because of the shallow water at many of the river ports of call, the vessel will be of the full tunnel stern type, with a light draft of 7 ft. She will have two rudders, a main rudder aft of the propeller and a monkey rudder forward of the propeller and above the shaft.

The vessel will be propelled by an 8-cylinder, 500-horsepower Atlas-Imperial diesel engine, driving a 78-inch propeller. The estimated speed is 15 miles an hour. For auxiliary power there will be a 60-horsepower Atlas-Imperial diesel, direct-connected to a 40-kilowatt electric generator.

The freight capacity of the L. P. Hosford is to be 350 tons. A Barlow cargo elevator will be installed forward of the house, as shown in the outboard profile reproduced herewith, capable of handling 5 tons and with a platform travel of 27 ft. The elevator is being manufactured by the Colby Steel & Engineering Co. of Seattle. The entire main deck, with the exception of a small wash room aft, will be used as cargo space. All cargo will be handled by electric lift truck.

Passenger accommodations will be provided for about 250 persons. There will be 19 staterooms on the upper deck with sleeping accommodations for about 50 people, together with dining room, smoking room, ladies lounge, purser's office, galley, and wash rooms. Officers will be quartered in staterooms aft of the pilot house. Quarters for 8 men will be in the hold forward of the engine room.

Fire pump, sanitary system, and all auxiliaries will be electrically driven and an electric range will be installed in the galley.

Architect Appointed for Supply Ship.—The U. S. Department of Interior, Bureau of Indian Affairs, has appointed W. C. Nickum, Room 400, Polson Bldg., Seattle, Wash., as naval architect for the new $400,000 Alaska Supply Ship to replace the famous old schooner Boxer. J. R. Ummel of the Purchasing and Shipping Unit of the Department, with headquarters in Seattle, will be in charge of the construction and of her operation when completed.

The new supply ship will be 225 ft. length over-all, 42 ft. beam, 22 ft. depth, 16 ft. draft. She will be powered with a 1500-horsepower diesel engine and will have a speed of 14 knots. Accommodations will be provided for 50 passengers, including fifteen 2-berth cabins, two suites with private bath, and steerage accommodations for 20 in the poop. All auxiliaries are to be operated by electricity. She will have a cruising radius of about 10,000 miles. General cargo capacity will be 1500 tons, with 16,000 cubic feet of refrigerated holds.

It is expected that plans and specifications will be ready so that bids may be asked from shipyards early in April.

Ferryboat Contract Let. — The Moore Dry Dock Company, Oakland, Calif., has been awarded contract for the diesel-electric powered ferryboat for the Automobile Ferry Company of Coronado, Calif. Lambie & Mabry, Security First National Bank Bldg., Wilmington, Calif., are the naval architects. The Moore Company bid $203,000 exclusive of the cost of propulsion machinery with building time 6-1 3 months.

The ferryboat is to be of steel construction, 210 ft. long, 65 ft. beam, 8 ft. draft. She will be powered with four 350-horsepower, 4-cycle, Atlas-Imperial diesel engines, direct-connected to four 260-kilowatt Westinghouse generators and four 30-kilowatt exciters. These will supply energy for two 1200-horsepower electric propelling motors, each connected to a propeller at each end of the vessel. The ferryboat will have a speed of 13.25 knots and will have capacity for 60 automobiles with a 4-lane driveway at each end. S. E. Mason is general manager of the San Diego-Coronado Ferry Co.

Oil Barges to be Built.—Federal Shipbuilding & Dry Dock Co., Kearny, N. J., has received contract from the Oil Transfer Co. of New York for a 10,000-barrel oil barge to be 175 ft. long, 36 ft. beam, 13 ft. depth, to be built on the Federal welded channel system.

Steamboat Hull Ordered. — The Nashville Bridge Co., Nashville, Tenn., has received an order from the Woods Lumber Co. for a 110 ft. steamboat hull to have a beam of 26 ft. and depth of 4 ft. 8 in.; also an order from the same company for a derrick hull to be 82 by 28 by 4 ft. dimensions.

The Sternberg Dredge Co. has ordered a barge from the Nashville Bridge Co. to have dimensions 100 by 26 by 6 ft. 6 in.

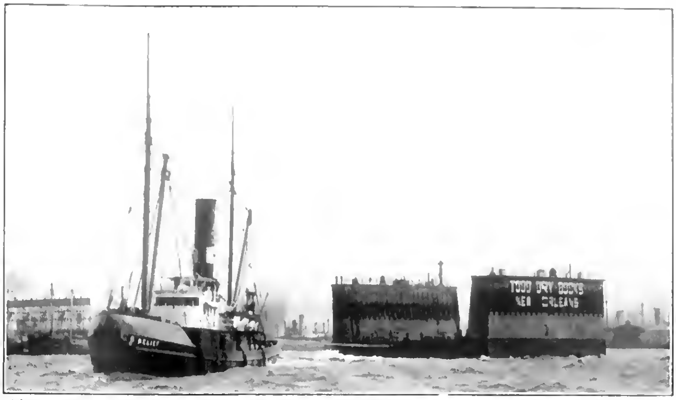
Contract for Propelling Plant Awarded. — Contract has been awarded to the Atlas Imperial Engine Co., Oakland Calif., for the diesel-electric machinery for installation in the lighthouse tender Columbine, now under construction at the Oakland yard of The Moore Dry Dock Company. The engine company's bid was $39,485, including General-Electric generators and motors and delivery promised in 170 days.

The tender is to be 121 ft. 4 in. over-all length, 25 ft. molded beam, 9 ft. minimum depth, and 6 ft. 8 in. draft. The power plant will consist of two 240-horsepower Atlas-Imperial diesel engines connected to General-Electric generators. The specified speed for the tender is $9\frac{1}{2}$ knots. Accommodations will be provided for a crew of 16, including officers. The cost of hull construction will be $139,949.

Bids to be Opened for Hawaiian Survey Boat.—Bids will be opened March 30 by the United States Army Engineers, San Francisco, for the construction of an inspection vessel for Hawaiian waters. The boat will be similar to the Suisun which is 65 ft. long, 16 ft. beam, and of 40 tons displacement. The boat will have twin screws, driven by diesel engines developing a total of 150-160 horsepower.

$225,000 for North Vancouver Ferryboat.—The City Council of North Vancouver will build, in the near future, a ferryboat to cost $225,000 approval of which was given by the voters recently. An effort is being made to amalgamate the ferry services of North Vancouver and West Vancouver as a step toward solution of the north shore transportation problem. The vessel mentioned above is to operate between North Vancouver and Vancouver proper.

To Convert Vessel to Fishing Boat.—A firm headed by Le Roy Kuykendall of Los Angeles Harbor, known as Fishermen, Ltd., have purchased the U.S.S. Eagle No. 8 for conversion into a seagoing tuna fishing vessel. The Eagle No. 8 is being brought from Honolulu to San Pedro for rebuilding. It is reported that the boat will be equipped with York ice machines with a total capacity of 60 tons, sufficient to freeze and refrigerate 200 tons of tuna in the cargo holds. The Eagle No. 8 is steam powered and the ice machinery will be driven by steam from the main boilers. Large bait tanks will be installed on deck, and she will have a cruising radius of 8000 miles.



Above is shown the tug Relief towing a 2000-ton section of a floating dry-dock to the plant of the Todd Shipyards Corporation at Algiers, New Orleans from Brooklyn, New York, a distance of 2000 miles. The section is 80 ft. long and 116-ft. wide. The addition of this section will give the plant a dry-docking capacity of 10,000 tons, capable of handling vessels up to 500 ft. in length.

The Eagle No. 8 is to be renamed Fortitude. She is 200 ft. in length, 25 ft. beam, and is driven by Poole geared turbines of 2500 horsepower, using steam generated by two navy-type express boilers. Her speed is rated 18.32 knots. It is reported by her owners that she will register more than 500 tons when rebuilt and will be the largest and fastest tuna fishing boat on the Pacific. It is further reported that the company plans tuna fishing trips to equatorial waters near the Galapagos Islands.

Contract Placed for Two Coastwise Liners.—The Newport News Shipbuilding & Drydock Company, Newport News, Va., has been awarded contract by the Eastern Steamship Lines, Inc., Boston, Mass., Eugene E. O'Donnell, president. for two twin-screw, oil-burning, passenger and cargo steamers to cost about $3,500,000 each. The vessels are intended for operation between Boston and St. John and New York and Yarmouth and are scheduled for delivery in May and June, 1932.

The two steamers will be 402 ft. 9 in. long, 61 ft. beam, 29 ft. 9 in. depth, and of 10,000 tons displacement. The propulsion machinery will consist of Newport News-Parsons type single-reduction, geared turbines developing 11,400 shaft horsepower. Steam will be supplied by four Babcock & Wilcox water-tube boilers at a working pressure of 375 pounds and 210 degrees superheat. Auxiliaries and galley will be electrically operated. The vessels will each have a speed of 20 to 22 knots.

These two vessels will have accommodations for 756 passengers. There will be 14 suites with private bath, and 12 twin-bed and Pullman berth rooms with private bath. The dining rooms will accommodate 250 persons at one sitting. A crew of 178 will be carried.

The cargo capacity of the vessels will be 158,900 cubic feet. The hull will be of steel construction, with nine transverse, water-tight bulkheads. Special fire prevention equipment will be installed, including the Lux fire extinguishing system and the Rich fire detection system, with automatic fire alarms in each compartment and stateroom.

Oil Tank Barges Ordered.—The Sun Shipbuilding Company, Chester, Pa., has received an order from the Standard Transportation Company of New York for two steel hull, oil tank, tow barges, each to be 225 ft. long, 38 ft. beam, 10 ft. depth, and to cost about $85,000 each.

Bids Asked on Oil Tanker.—The Standard Transportation Company, 26 Broadway, New York, subsidiary of the Standard Oil Company (N. Y.), has received bids March 2 for the construction of one or two 15,000-barrel, diesel-powered oil tankers for coastwise service. The vessels will have twin screws, and will be propelled by diesel engines developing a total of 1000 horsepower. They will be 262 ft. long, 43 ft. 6 in. beam, and 25 ft. 6 in. depth.

Work on Superliners is Delayed. —The Shipping Board stated orally March 11, through Commissioner E. C. Plummer, vice-chairman, that the two superliners which the United States Lines expected to have ready for the North Atlantic trade by 1933 are not expected to be built in the near future. The board has not yet given final approval for the plans for the vessels and has not granted a construction loan. According to Mr. Plummer's statement, the Board does not feel that construction of such expensive vessels at the present time is a particularly practical venture. The United States Lines has carried out all the provisions of the contract under which it bought its present fleet from the Board, however; but increases in the rates of mail pay must be granted before such ships can be undertaken.

Work on the two 666-ft. liners for the United States Lines at the yard of the New York Shipbuilding Company is progressing, with the launching of the first liner scheduled for December.

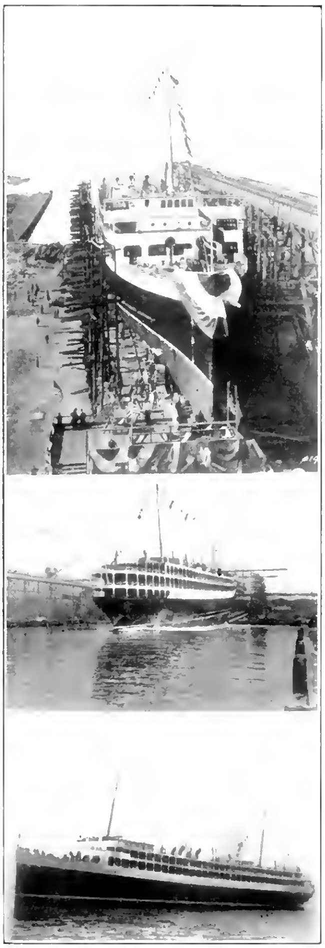
Destroyers to be Built by Navy.— The Naval Appropriation Bill, recently passed by both houses of Congress and signed by the President, carries an appropriation of $10,000,000 towards the construction of 11 new destroyers. The construction of twelve destroyers was authorized by Act of August 29, 1916, but the funds are just being made available. It is hoped that orders for 10 destroyers and one destroyer leader will be placed by July. The appropriation is for the fiscal year 1931-1932. Construction of the 11 destroyers will require an ultimate expenditure of $47,000,000, according to the Navy Department; the leader being estimated at $5,000,000 and the other 10 at $4,200,000 each. In passing the Appropriations Bill Congress stipulated that as many as possible of the destroyers shall be built in navy yards. A strong effort is being made to bring some of this work to Pacific Coast Navy Yards.

The same bill carried an appropriation of $10,000,000 for the fiscal year 1932-1933 for modernization of the battleships New Mexico, Mississippi, and Idaho. Work on these ships will probably be done entirely in East Coast navy yards.

Canadian Hydrographic Survey Vessel Ordered. — It is reported that the Collingwood Shipyards, Ltd., Collingwood, Ontario, have been awarded contract by the Dominion Government for the construction of a survey vessel for the Canadian Government Hydrographic Survey Service, and headquarters of the vessel will be Victoria, B. C. The reported cost will be around $600,000.

The vessel is to be 214 ft. long, 37 ft. beam, 13 ft. maximum draft, and is to be propelled by reciprocating engines driving twin screw to give a speed of 12 knots. She will be equipped with four gasoline launches, propelled by 25-horsepower Thorneycroft engines, three small outboard motorboats, two lifeboats, three dinghies for sweeping, and six dories for surf landings. All boats will be handled by Welin-MacLachlan automatic type davits. Navigating and surveying equipment will be the most modern types and complete in every respect.

A similar vessel is planned for St. Lawrence service.



Launch of the Peninsular & Oriental steamer Florida by Newport News Shipbuilding & Drydock Co., March 7, 1931; 365 ft. L.B.P., 56 ft. 6 in. beam; 28 ft. 6 in. depth. She is powered by two sets of cross-compound, geared turbines; steam supplied by Babcock & Wilcox boilers. Horsepower rating is 8500: 19½ knots speed.

Cruiser Chicago Has Trials.—The newest U. S. Navy Scout Cruiser (CL29) Chicago, completed her first test cruise on San Francisco Bay, March 11, and was reported to have a "100 per cent. performance." March 17 to March 20 she had a three-day ocean test run outside the Golden Gate. The Chicago was built by the Mare Island Navy Yard, the same plant that turned out the Submarine V-6. Another cruiser, C.L. 38, is now under construction and Rear Admiral G. W. Laws, yard commandant, has forwarded a request to the Navy Department that one or more of the destroyers whose construction was authorized by the recent Naval Appropriations bill, be assigned to this yard for construction.

The Cruiser Louisville (C. L. 28) was placed in commission at the Puget Sound Navy Yard, Bremerton, Washington, January 15, and is now in service in Pacific waters. The Bremerton yard has another cruiser under construction, the Astoria, (C. L. 34), keel for which was laid September 1.

Rebuilt Ferry in Service.—The ferryboat Leschi of the Lake Washington Ferry Service has been rebuilt and equipped with a 560-horsepower Washington diesel engine and is again in service between Leschi Beach, Seattle, and Medina on the opposite side of Lake Washington. The work of rebuilding was done by the Lake Washington Shipyards, Houghton, and the cost of the work, including the new engines, is said to be about $100,000. The engine was built by the Washington Iron Works, Seattle.

Diesel Towboat Ordered. — The Spedden Shipbuilding Co., Baltimore, Md., has an order from the Atlantic, Gulf & Pacific Co. of New York for a diesel tug to be 35 ft. between perpendiculars, 11 ft. 7 in.

beam, and 4 ft. 1 in. loaded draft, powered with Fairbanks-Morse diesel engine of 75 brake horsepower.

Cannery Tender Launched.—The Barbee Dry Dock & Shipbuilding Corp., launched March 14 the cannery tender Roeda for James and Lisle Davis of Juneau, Alaska. The vessel is powered by a 170-horsepower diesel engine.

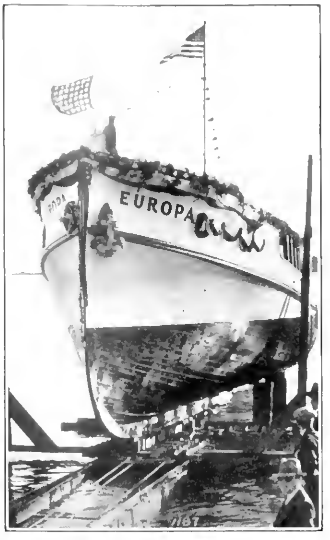
New Boat Company.—The Eastbay Boat Company has been established at 3026 East 14th Street, Oakland, Calif., by C. F. Cooper and H. E. Menkens. The firm has 2500 square feet of floor space which will be used as a show room and for manufacturing purposes. It is reported that the firm will specialize in the manufacture of a double cock-pit runabout design for outboard motors and will deal in new and used boats and motors.

New Engine in Tug.—The tugboat John N. Stewart is having a new 600-horsepower Winton diesel engine installed, to be direct-connected to the propeller shaft. The tug is owned by the Wilmington Transportation Company, Wilmington, Calif.

Big Repair Job Completed.—The tanker Tamiahua of the Richfield Oil Company was released from the plant of the Bethlehem Shipbuilding Corp., San Francisco, early in March, after extensive repairs. The Tamiahua went aground on November 6 about five miles north of Pigeon Point on the California Coast. The vessel was floated on November 26 by Merritt-Chapman & Scott Corp. and towed to the Hunter's Point Dry Dock of the Union Plant, where she remained for several weeks having the bottom damage repaired. Following the bottom repairs, the tanker was moved to the Potrero Works where her machinery was overhauled. The total cost of the repairs amounted to $543,000 and contract called for completion in 115 days, although the company did better than schedule.

The salvaging of the Tamiahua was considered one of the finest jobs of its kind executed on the Coast in many years and was described in detail in the January issue of Pacific Marine Review. Putting a new bottom on this tanker was the biggest repair job performed on the Coast in many years.

Fishing Vessel Europa Launched.—The fine new diesel-powered fishing vessel Europa was launched by the Campbell Machine Works Company, San Diego, Calif. on February 21 for Captain M. Crivello. The owner's young daughter Esther Crivello was the sponsor. Mr. Crivello is also the owner of the tuna fisher G. Marconi and he has three sons who work together as members of the crew on their father's vessels. Jack, the eldest, acts as engineer; Sammy is a radio operator and fisherman; and Vincent is also a fisherman. The launching was quite a festive occasion. There were approximately 500 people in attendance and a buffet luncheon was served following the launching.



The Europa is 117 ft. long, 25 ft. beam, 11 ft. 6 in. depth. She is powered by a 350 horsepower, 6-cylinder Union diesel engine. Auxiliary power is supplied by one 45-horsepower, 3-cylinder Atlas-Imperial diesel engine, direct-connected to a 20-kilowatt Westinghouse generator and an 8-in. Byron Jackson centrifugal bait pump. A 30-horsepower, 2-cylinder Atlas-Imperial diesel is direct-connected to a 20-kilowatt Westinghouse generator and an 8-inch Byron Jackson bait pump. Other auxiliaries include Campbell Machine Co.'s own manufacture cargo winch, deck winch, and anchor windlass, all driven by 5-horsepower direct-current motor.

Will Manage Yard.—Captain Albert T. Church, U. S. N., in charge of the post graduate school at Annapolis, has been ordered to duty as manager of the Puget Sound Navy Yard, Bremerton, Wash. effective early in June.

Oil Barges to be Built.—The Sun Shipbuilding Co., Chester, Pa., has an order from the Standard Transportation Co. of New York for two steel hull, oil tank tow barges to be 225 ft. long, 38 ft. beam, 10 ft. draft.

Steamboat Hull Ordered. — The Nashville Bridge Co., Nashville, Tenn., has an order from the Woods Lumber Co. for a 110 ft. steamboat hull. The boat will be 26 ft. beam and have a depth of 4 ft. 8 in. This yard also has an order for a derrick hull for the same firm to be 82 by 28 by 4 ft.

The Sternberg Dredging Co. has placed an order with the Nashville Bridge Co. for a barge 100 by 26 by 6 ft. 6 in.

New Boatyard.—An application has been filed with the Township of Sausalito, Calif., by the Enterprise Boat Building Co. of San Francisco for permission to build a $30,000 motor boat factory in Old Town cove. It is reported that a building 160-ft. long is contemplated.

Bids Opened for Battleship North Dakota.—The Union Shipbuilding Co., Baltimore, Md., was high bidder for the old battleship North Dakota which is to be scrapped. The bids of the Union Shipbuilding Company was $87,206. Other bids submitted by N. Block & Co., Norfolk, Va., $72,276; Boston Iron & Metal Co., Baltimore, $82,000. It is said that the North Dakota cost $4,377,000 when she was built in 1907. She has been out of commission since 1923.

Ship Sold for Dredge. Sale of the steamship Brookline to the O'Brien Brothers Dredging Corporation, New York, for the sum of $12,500 with the understanding that the vessel be converted into a self-propelled gravel dredge at a cost of not less than $150,000 was authorized by the Shipping Board, January 7. The Brookline is a steel cargo vessel of 8550 deadweight tons, equipped with reciprocating engines and Foster boilers, and has been in lay-up since September, 1921.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of March 1, 1931

Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd.
Union Plant, San Francisco

Hull 5347, steel barge for Young Bros., Ltd., Honolulu, Hawaii; 175x44x11 ft.; keel 1 2 31; **launched 2 20/31;** deliver 4 1 31 est.

Hull 5348, same as above; keel 1 12/31; launch 3 12 31 est.; deliver 4 1 31 est.

Mamo, hull 5349, steel tug for Young Bros., Ltd., Honolulu; 129'3" L.O.A.; 28 beam; 15 draft; Fairbanks-Morse 750 I.H.P. diesel engs., launched 2 14 31; deliver 4/1/31 est.

Hull 5350, pineapple barge for Inter-Island Steam Navigation Co., Honolulu; 175 x 44 x 11 ft.; **keel 3/2/31;** launch 4/21/31 est.; deliver 5/1/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30; launch 4/2/31 est.

Not named, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles. L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft, two 500 H.P. Winton diesel engs., keel Apr. 31 est., deliver Aug. 31 est.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; keel 3/15/31 est.

JOHNSON SHIPBUILDING CO.
329 Willow Street, Seattle, Wash.

Purchasing Agent: Geo. H. McAteer.

Hull J 79, scow for P. E. Harris & Co.; 60 x 16 x 4 ft.; **keel 1/18/31;** launch 2/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

Not named, vee-bottom wooden pleasure cruiser for L. W. Kengin, Prince Rupert; 34 L.B.P.; 8 beam; 2'9" depth; 10 knots speed; 34-B.H.P. Redwing eng.; keel 11/1/30; launch and deliver 3/14/31 est.

Bobolink, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink. keel 12/8/30; launch 4/31/31 est.

Not named, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8'6" molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; **keel 2/15/31.**

U. S. NAVY YARD,
Bremerton, Wash.

Louisville, light cruiser CL-28 for United States Navy; 10,000 tons displacement; keel July 4/28; launched 9/1/30; deliver Mar. 13/31 est.

Astoria, light cruiser CL-34, same as above; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

Chicago, light cruiser CL-29 for United States Navy; 10,000 tons displacement; launched 4/10/30; deliver 3/13/31 est.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Dock, clean, paint, misc. repairs: stmrs. Argyll, La Brea, Illinois, Nora, Commissioner, Barbara, Clemente, Lake Galewood, Petroleum No. 3, Alaska Standard, District of Columbia, Matsonia, La Perla, Chas. L. Wheeler, Jr., Montezuma, Admiral Peary, Charlie Watson, Horace Luckenbach, J. B. Stetson, Sea Lion, Trimountain, launch Asama, Barge No. 4, U.S.S. Mississippi. Drydock for survey: barge Erskine M. Phelps. Repair crankshaft: Brunswick. Pipe repairs: D. G. Scofield, Montebello, Ruth Alexander, Emma Alexander. Dock, clean, paint, renew 1 piece defective shoe on keel aft: launch Musketeer. Install generator and make 11 cylinders: m.s. Lio. Drill, tap, and cut oil grooves: m.s. William Penn. 1 forged steel tailshaft: Margaret Dollar, Cathwood (also 1 C. I. Propeller hub). 1 manganese bronze propeller blade: Luckenbach S. S. Co. 2 Mag. bronze propeller blades: General Engineering & D. D. Co. Recondition tailshaft: Willapa. Misc. repairs: Golden Way, Daisy Gadsby, Golden Dawn, President Polk, City of Sacramento, Esparta, Lubrico, Saramacca, President Jackson, Pennsylvania, Monowai, Willmoto, Chas. L. Wheeler, Jr., Petroleum No. 3, Suriname, Santa, F. J. Luckenbach, Lebec.

CHARLESTON DRYDOCK & MACHINERY CO., Charleston, S.C.

General overhauling: dredge Augusta. Annual overhaul: tug Cecilia. Annual scraping and painting: yacht Sea King.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Drydock, clean, paint: s.s. Buffalo Bridge (also overhaul sea valves, repack stern gland, caulk and renew rivets in shell and other misc. repairs), m.s. Nordanger (drew stbd. tail shaft, removed propeller to shop, welded and strengthened blades, checked pitch, renewed rivets in bilge keel, rewooded stern bearing, and other misc. engine dept. repairs), Admiral Dewey (overhaul sea valves, caulk and weld rivets in shell), Betterton (also caulk miscl. shell rivets and seam, repack stern gland, overhaul sea valves), m.s. Lawrel (also overhaul sea valves and strainers, repack stern gland, caulk misc. shell rivets, remove and replace cylinder heads of main engine, renew misc. copper pipe), s.s. Wisconsin (also renew shell rivets, weld shell rivets, clean tanks, misc. eng. work), schr. Louise (also repair rudder), s.s. Tamalpais (fit graving pieces in hull, repack stern gland, overhaul sea valves, repair boilers and other misc. work), s.s. Stanley Dollar (overhaul sea valves, drew both tailshafts for examination, rewood inboard and outboard bearings, replace one condemned shaft with spare shaft), pilot boat Adventuress (also rewood stern bearing, misc. hull repairs), s.s. Yarraville (misc. voyage repairs), ferry San Leandro (also rewood stern bearing, drew tail shaft), barge St. Helena (also caulk and repair leaks). Drydock, remove broken propeller to shop, blank off stern tube: Golden Eagle. Drydock for renewal of shell and deck plating, house, piping, overhauling of engines due to fire damage, cleaning, and painting: tanker Redline.

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Docked, clean, and paint, general overhaul: s.s. Prince Charles. Dock, clean, paint, alterations and repairs necessary for conversion from fishing to passenger boat: launch Katherine B. Docked, clean, paint, misc. hull and engine repairs: 2 fish boats. Misc. hull and engine repairs: 28 fish boats.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle, Wn.

Drydock for cleaning and painting: stmrs. Alaska, Yukon, Border King, (also misc. repairs), Kulshan, barge Nisqually, launch Petroleum II. General repairs: U.S. C.G. Snohomish. Voyage repairs: President Pierce. Misc. repairs: stmrs. Abron, Manhattan Island, Narenta, Point San Pablo.

U. S. NAVY YARD, Bremerton, Wn.

Misc. repairs and docking: Tennessee, Oklahoma, Buchanan, Waters. Minor repairs: Eagle No. 47, Haida. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x26x11 ft.; 5 delivered July/30.

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **1 keel 2/23/31.**

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; **keel 1/1/31;** deliver 3/25/31 est.

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named; 168 L.B.P.; **26 beam; 9 draft; twin Winton diesel engs.; 1600 I.H.P.**

Trudione, hull 138, steel yacht, owner

At right are shown two repair jobs under way at plants of United Dry Docks, Inc., New York. At left is the steamer Harry Bowen having the entire bottom renewed in 45 days at the Morse Plant. At right is the steamer Santa Marta at the Fletcher plant, undergoing general overhaul and reconditioning.

not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launch 4/10/31 est.

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30; launch 4/15/31 est.; deliver 4/25/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30, launch 6/20/31 est.; deliver 8/10/31 est.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B.H.P. Fairbanks-Morse diesel eng.; keel 10/15/30; launch 3/19/31 est.; deliver 4/25/31 est.

Maine, hull 143, sister to above: keel 10/18/30; launch 4/4/31 est., deliver 4/25/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.: 550 B.H.P. ea.; keel 10/6/30; launch 4/7/31 est.; deliver 6/2/31 est.

Halonia, hull 145, diesel-elec. yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.; keel 1/13/31.

Not named, hull 146, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/16/31 est.; deliver 7/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 4/25/31 est.; deliver 11/29/31 est.

Hull 148, same as above; keel 4/25/31 est.; deliver 12/24/31 est.

Hull 149, same as above; keel 4/25/31 est.; deliver 1/18/32 est.

Hull 150, same as above; keel 4/28/31 est.; deliver 2/12/32 est.

Hull 151, same as above; keel 4/28/31 est.; deliver 3/9/32 est.

Hull 152, same as above; keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hulls 4268-4273, six steel oil barges for Lake Transport Corp.; 4271 launched 5/22/30; 4270 launched 6/20/30; 4272 launched 6/27/30; 4268 launched 7/20/30; 4273 launched 9/10/30.

Hull 4274, steel carfloat for Central R.R. of New Jersey; launched 9/26/30.

Hulls 4277-4278, two steel barges for Baltimore and Ohio R.R.; launched 9/19-9/29/30.

Harmony, hull 4280, steel oil tanker for Gulf Refining Co. **launched 1/26/31.**

Not named, hull 4281, same as above; launched 12/17/30.

Hull 4283, steel barge for The Arundel Corp.; **launched 1/20/31.**

Hull 4284, steel barges for Western Maryland Railway Co.

Hull 4285, same as above.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel ferryboat for the Seaboard Air Line; 65 x 22 ft., 120 H.P. Fairbanks-Morse eng.; keel 3/31 est.; launch 5/31 est.

One all-welded steel yacht, owner not named; 50 x 13 ft.; diesel eng.; keel 11/30.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2994, 81-foot commuter boat, owner not named; 2 300-H.P. Speedway engines.

Hull 2996, 110-ft. cruiser for A. M. Dick; 3 300-H.P. Speedway diesels.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Danora, hull 145, steel yacht, owner not named; 108 L.B.P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30; launch 4/15/31 est.; deliver 5/1/31 est.

Rosewill II, hull 146, steel yacht, owner not named; 126 L.B.P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30.

Ber-clo III, hull 147, steeel yacht for E. S. Close, Toledo; 106 L.B.P.; 17'6" beam; 6 loaded draft; 14 M.P.H.; 98 D.W.T.; 300 I. H. P. diesel eng.; keel 11/25/30; launch 4/15/31 est.; deliver 5/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hulls 1067-1072 incl., six misc. cargo barges for stock, 130x30x8'6"; **4 delivered.**

Hulls 1074-1083 incl., 10 hopper type steel coal barges for stock, **2 delivered.**

Hull 1084, 50-ton whirler derrick boat for Erie Railroad Co.

Hull 1085, one steel derrick barge for Atlantic, Gulf & Pacific Co., 60x30x6 ft.

Hulls 1086-1115 incl., 30 hopper-type steel coal barges for stock 175x26x11 ft.

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Hull 119, steel harbor barge for Oil Transfer Corp.; 175x36x12'7-1/8"; keel 5/19/30.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary). 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers.

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 water-tube boilers; keel 3/15/31 est.; launch 5/1/31 est.; deliver 6/15/31 est.

Hull 277, sister to above, keel 3/25/31 est.; launch 5/15/31 est.; deliver 7/1/31 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; **keel 2/9/31;** launch 3/15/31 est.; deliver 4/15/31 est.

One towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 5/1/31 est.

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer.

Not named, hull 268, steel tug, for Great Lakes Dredge & Dock Co.; 115 x 26 x 15 ft.; one Babcock & Wilcox boiler; 850 H.P.

turbine with reduction gear. keel 1/12/31; launch 3/20/31 est.; deliver 5/31 est.

Hull 269, dump scow for Ed. E. Gillen Co., Milwaukee; 124 L.O.A., 30 beam; 11'6" depth; **keel 1/21/31.**

Hull 270, deck scow for U. S. Engineers, Chicago; 56 x 20 x 4'8". **keel 2/12/31.**

Hull 271, deck scow for Great Lakes Dredge & Dock Co.; 130 x 40 x 9 ft.; **keel 2/25/31.**

Hull 272, same as above: **keel 2/27/31.**

MARIETTA MANUFACTURING CO., Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S. Engineering Office, New Orleans; 65'6"x17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY Midland, Pa.

Steel freighter for Victor Lynn Transportation Co.; 210 gro. tons; keel 12/30.

Two barges for E. T. Slider, 120x30x7'6".

Ten barges for U. S. Engineers, Rock Island, Ill.; 110x24x5 ft.

Five barges for Inland Waterways, Corp., Washington, D.C.; 230 x 45 x 11 ft.

NASHVILLE BRIDGE COMPANY, Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 240, deck barge for Bedford Nugent Co.; 100x26x6'6"; keel 8/15/30; launched 9/17/30.

Hull 241, same as above; keel 8/28/30; launched 9/26/30.

Hull 242, same as above; keel 8/30/30; launched 10/1/30.

Hull 243, same as above; keel 9/4/30; launched 10/6/30.

Hull 244, deck barge for stock; 100x26x6'6"; keel 10/20/30; launched 12/4/30.

Hull 245, same as above; keel 11/6/30; **launched 2/11/31.**

Hull 246, same as above; keel 11/13/30; **launched 2/26/31.**

Hull 247, same as above; keel 11/16/30.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31.

Hull 249, same as above; **keel 1/17/31.**

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; keel 3/12/31 est.; launch 4/7/31 est.

Hull 251, deck barge for Bedford-Nugent Co.; 110x28x7'3" depth; keel 3/2/31 est.; launch 3/16/31 est.

Hull 252, same as above; keel 3/9/31 est.; launch 3/23/31 est.

Not named, hull 253, steamboat hull for Woods Lumber Co.; 110 L.B.P.; 26 beam; 4'8" depth; keel 4/6/31 est.; launch and deliver 5/2/31 est.

Hull 254, derrick hull for Woods Lumber Co.; 82 x 28 x 4 ft.; keel 4/13/31 est.; launch and deliver 5/9/31 est.

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 4/20/31 est.; launch and deliver 5/16/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY Newport News, Va.

Purchasing Agent: Jas. Plummer, 233 Broadway, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 7/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; launch 3/7/31 est.; deliver 5/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 9/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/31 est.; launch 11/31 est.; deliver 4/32 est.

Chiriqui, hull 346, sister to above; keel 5/31 est.; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; deliver 5/32 est.

Not named, hull 351, sister to above; deliver 6/32 est.

NEW YORK SHIPBUILDING CO. Camden, N. J.

Purchasing Agent: J. W. Meeker.

Exeter, hull 396, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 8/11/30; launch 4/4/31 est.

Excambion, hull 397, sister to above; keel 10/25/30; launch 5/16/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel spring/31 est.

Not named, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers.

THE PUSEY & JONES CORP., Wilmington, Del.

Purchasing Agent: James Bradford.

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; launch and deliver 3/15/31 est.

Locust Point, hull 1049, two steel, single-screw, harbor tugs for stock; 92 L.B.P.; 23 beam; 12'6" loaded draft; steam eng. 1 Scotch boiler; keel 12/2/30; **launched 2/17/31.**

Girard Point, hull 1050, same as above; keel 12/2/30; **launched 3/2/31.**

Not named, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; **keel 2/12/31.**

SPEDDEN SHIPBUILDING CO., Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 269, steel hull diesel tug for Atlantic, Gulf & Pacific Co., New York; 57 L.B.P.; 14 beam; 5'6" loaded draft; 120 H.P. Fairbanks-Morse diesel eng.; keel 2/10/31 est.; launch 3/10/31 est.; deliver 4/1/31 est.

Not named, hull 270, diesel tug for Atlantic, Gulf & Pacific Co., New York; 35 L.B.P.; 11'7" beam; 4'1" loaded draft; 75 B.H.P. Fairbanks-Morse diesel eng.

SUN SHIPBUILDING COMPANY, Chester, Penn.

Purchasing Agent: H. W. Scott.

Northern Sun, hull 131, single-screw, diesel tanker for Motor Tankship Corp.; **13,400** D.W.T.; keel 7/15/30; launched 1/31/31; **delivered 2/12/31.**

Southern Sun, hull 132, sister to above; keel 8/21/30; launch 3/21/31 est.; deliver 4/1/31 est.

Not named, hull 133, sister to above; keel 9/17/30; launch 6/13/31 est.; deliver 7/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 127, single screw diesel oil tanker for Standard Transp. Co.; **480 x** 65'9" x 37'; Sun-Doxford diesel eng.; keel 11/13/30; launch 5/16/31 est.; deliver 6/1/31 est.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 6/1/31 est., deliver 6/15/31 est.

Hull 139, steel oil-tank towing barge for Standard Transp. Co.; 225 x 38 x 10 ft.

Hull 140, sister to above.

TODD DRY DOCK, ENGINEERING & REPAIR CORP., Brooklyn, N.Y.

Not named, hull 50, steam ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan./31.

Not named, hull 51, sister to above; keel Jan./31.

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel Jan./31.

UNITED DRY DOCKS, Inc. Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3220 I.H.P.; 2 W.T. boilers; **keel 2/17/31;** launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; **keel 1/31/31;** launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD, New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD, Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD, Portsmouth, Va.

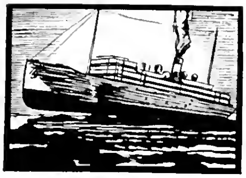
V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

THE CHARLES WARD ENGINEERING WORKS Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30; **deliver** 3/15/31 est.

Vesta, hull 89, sister to above; keel 10/9/30; deliver 4/5/31 est.



Marine Insurance

Edited by James A. Quinby

Freight

The Relation of the Insurer and Cargo Owner to the Earnings of the Ship

IN any technical discussion, the use of the term "freight" should be restricted to the money to be paid for the carriage of goods. This caution is made necessary by the careless use of the word, in some quarters, to denote goods carried. Such goods, of course, should always be spoken of as cargo.

In the earlier days of organized ocean transport, when contracts of affreightment could be and were jotted down on the backs of old envelopes, it was the custom to pay freight out of the profits on the cargo. The shipowner was thus normally a partner in the venture. Because of this custom, it was early established as a principle of English and American maritime law that a contract of affreightment was entire in nature, and that no part of the freight money was earned until the contract voyage was completed and the goods delivered.

This doctrine was not entirely pleasing to the shipowner, who began to amplify his bill of lading as a means of self-protection. The most obvious means of protection was to require the freight to be paid in advance. Such freight was classified as "prepaid," while that depending upon delivery was known as "collect" freight.

At this stage of development of the law, however, even prepaid freight was not irrevocably saved to the shipowner, for the courts held that in case of the failure of the voyage, such freight money had to be returned to the cargo owner. This holding was based upon the entirety of the voyage as a prerequisite to the earning of freight. In the absence of a valid provision to the contrary in the bill of lading, the shipowner must, even today, complete his voyage and deliver his cargo in order to earn and retain his freight, whether that freight be prepaid or collect. Under such conditions, the vessel, if disabled, may repair and carry the cargo to destination, thus earning her freight, provided the delay in repairing is not so unreasonable in length as to constitute an abandonment of the voyage. There is no arbitrary standard by which to determine whether or not a delay is unreasonable, but each case must be governed by the nature of the cargo, the demand of the market, and other factors. Furthermore, under such conditions, the shipowner may forward the cargo by another vessel, and thus become entitled to his original freight. In the absence of a contract provision to the contrary, however, he must bear the expense of transshipping and forwarding.

> ### *Headlines*
>
> Time was when news of ocean wrecks
> Could make my brow turn pale,
> But now I know that make-up men
> Produce the howling gale.
> And so I read, without a qualm,
> "Malolo Crashes Yale ! !"
> I'll learn tomorrow that she brushed
> Some paint from off the rail.
>
> J. A. Q.

Development of Protective Freight Clauses

It can easily be seen that the basic law on the subject, if unaffected by agreement, subjected the shipowner to two very distinct hazards:

(1) he might lose his prepaid freight by a failure of the voyage, and (2) if he forwarded the cargo, the cost of such forwarding might well eat up his profit on the original freight.

To avoid the penalty of the first of these hazards, the shipowner and his attorney have devised what is known as the "lost or not lost clause," which usually provides that "prepaid freight is to be considered as earned and retained by the shipowner, vessel or cargo lost or not lost at any stage of the voyage." This provision has consistently been held valid by the American courts. (See Portland Flouring Mills vs. British and Foreign Marine Insurance Co., 130 Fed. 860). In the absence of such a provision, however, prepaid freight is still returnable to the cargo owner. (See The Three Marys, 1927 A.M.C. 783).

As soon as the "lost or not lost" clause was held valid, it became quite easy to protect the forwarding charges which form the basis of the second hazard mentioned above. If the shipowner could, by agreement, arrange to retain his freight, even if not actually earned, he could certainly shift a mere forwarding charge to the cargo owner. This he immediately proceeded to do by the adoption of suitable clauses asserting the right to transship or store goods on shore in the event of an interruption of the voyage, at the cargo owner's risk and expense. Some of these clauses are more specific than others, but all modern bills of lading contain one or more paragraphs enabling the shipowner to collect or retain his full freight upon an interrupted voyage, and to saddle the cargo with an additional freight for forwarding. These clauses have also been held valid by our courts. Although this development of the law may seem somewhat inequitable from the viewpoint of the cargo owner, it must be admitted that the contrary doctrine would be just as hard on the shipowner. Somebody has to pay the bill.

The Insurance Angle

Ordinarily, a cargo owner insures his goods at an agreed advance over their invoice value, usually 10 per cent., plus prepaid or guaranteed freight. This is because he stands to lose such freight under the "lost or not lost" clause in the bill of lading if the vessel suffers a casualty. Collect freight, in its narrowest sense, is of course at the risk of the shipowner, and is usually insured by him under a freight policy.

Because of guaranteed freight clauses and similar provisions in the modern bill of lading, cargo-owners have of late been adding freight to their declarations under cargo policies, even where such freight was technically collectible at destination.

It would seem, then, that in the absence of oversight or omission in the bill of lading, the shipowner of modern times is well protected as regards his freight money. There are, however, one or two points where the protective armor is so heavy as to constitute a potential embarrassment. Under the so-called Limitation Statute, for example, the shipowner may limit his liability for damage caused by or through his vessel to the value of his interest in the vessel after the accident, plus the pending freight on the voyage. The more successful he is in devising clauses transforming collect freight into guaranteed freight, the more he will have to surrender in limitation proceedings, for guaranteed freight should certainly be held to be pending freight under the terms of the statute. And after the freight is thus surrendered, the vessel owner is by no means certain of collecting it from a multitude of shippers, each of whom has a potential counter-claim for loss of cargo.

Furthermore, it has never been definitely decided whether the lost or not lost clause is valid when negligent navigation is the cause of the loss. In fact, in certain cases, notably the Willdomino, 300 Fed. 5, it is held that freight under the clause is not due where cargo has been so damaged by the carrier's negligence as to be indeliverable in specie. If the "in specie" part of this decision is controlling, all a master has to do to earn his freight is to jettison the cargo as soon as it becomes so damaged as to lose its identity. If (which is more likely) the negligent causation is the dominant element, the freight, even if governed by a "lost or not lost" clause, is not irrevocably saved to an owner whose crew negligently causes loss or damage to cargo by errors in navigation, management, or stowage.

Wahkeena Salvage Case Decided

ON March 4, Federal District Judge Cushman of Seattle handed down a decision, interesting to Pacific Coast underwriters and shipping men, in a salvage case arising from the loss of the McCormick steamer Wahkeena off Grays Harbor in August 1928.

After loading lumber at Aberdeen, the vessel sailed for San Pedro. Outside the harbor, but before crossing the bar, she grounded in a dense fog on the south jetty, which is partly constructed of rock. She blew distress signals, and the tug John Cudahy responded. As to the assistance rendered, the court says:

"There is a dispute in the testimony as to whether the tug pulled the Wahkeena off the jetty or whether, with the slackening of the tide, she was freed and the tug merely towed her away from the jetty. The preponderance of the evidence is to the effect that the John Cudahy pulled the Wahkeena off the jetty and towed her slowly back towards Aberdeen. After coming out of the fog the tug Tussler and the tug Tyee, the latter a tug also belonging to the libelant, assisted in towing the Wahkeena back to the dock at Aberdeen, which was reached between 9:00 and 9:30 P.M., August 29, 1928. There was delay in pumping out the Wahkeena and she submerged after 2:00 A.M., the next morning.

The Wahkeena had a crew of twenty-eight men aboard. Under the circumstances disclosed, unless the Wahkeena capsized, it appears that the members of the crew were not in great and immediate danger but if she had done so in the fog with the tide running out to sea across the jetty, she being broadside to the slope of the jetty with a considerable deck load, this danger was by no means unlikely and it is not improbable there would have been lives lost. Testimony was given that a list of 15 degrees developed and the cargo shifted. Before the Wahkeena was pulled off the jetty the cover was taken off of the available lifeboat and the crew brought their effects from below."

After a month, during which time the owners sought purchasers, she was sold for $5000. The owners claimed to deduct from this value the sum of $2000, representing bills incurred in pumping out the ship prior to sale. The court finds, however, that $500 would have been a reasonable allowance for pumping charges. It is further held that the cargo of lumber, when landed, had a net value of $11,325.

In regard to the element of danger to both vessels, the court comments as follows:

"The fact that a vessel insured for $125,000 was damaged beyond justifiable repair in four hours pounding on this jetty is alone sufficient, with the other circumstances already stated, to evidence the fact that she was in great danger of—with her cargo—becoming a total loss. After the damage to the vessel the insurance company paid the owner $75,000 and allowed it to retain the vessel.

"The danger to the tug John Cudahy was likewise great. Both at the time of pulling on the Wahkeena and during the time the tug was standing by she was in danger of being carried by the set of the tide upon the jetty and the spur. She stood near for three hours in a dense fog. All parts of the jetty were at all times submerged, and the only aid she had in determining her location with relation to the jetty was her compass and the stranded Wahkeena which she could only keep in view by remaining within a few hundred feet of the jetty. That the situation was considered dangerous is evidenced by the fact that although the stranding was immediately reported at Aberdeen none other of the numerous vessels on Grays Harbor ventured into the fog near the stranded Wahkeena."

The court then concludes that the operation constituted a salvage service, and that the salvors should receive an award of half the saved value of the ship and cargo, or a total of $8162.50.

In view of the facts, this is a generous award, and is probably explained by two factors, (1) the desire of the court to encourage salvors and (2) the high insured value of the vessel. The first of these is always present, and has been a constant element in American salvage cases since the days of Justice Story. The second item is peculiar to Pacific Coast underwriting method. The Wahkeena was insured for $125,000, a sum far in excess of her value. After the accident, the insurers paid the owners $75,000 and allowed the owners to keep the wreck. Although these elements are by no means conclusive as to values, they cannot but have some influence upon a salvage award.

Hubble Towing Co., the salvors, were represented in the litigation by John C. Bowen of Seattle, while Lillick, Olson and Graham appeared for the Wahkeena. It is understood that an appeal will be taken.

New Method of Collecting Claims

At first blush, it seems a far cry from clams to claims, but disgruntled claimants on the Pacific Coast might do well to consider Oriental customs, as indicated by the following news story culled from the columns of the Tokyo "Japan Times" of February 26, 1931:

"The Yokohama office of the Osaka Shosen Kaisha was the scene of an extraordinary demonstration at eleven o'clock Tuesday morning when over two hundred angry fishermen representing the districts at Hommoku and Kiminato arrived with a motor truck loaded with a ton of clams which they dumped on the door step of the shipping office in protest against the nonrecognition of the claim for damage to their seaweed beds and clam farms on the beaches at Hommoku through floating oil from the O.S.K. steamer Arabia Maru which was beached at Furo on the Chiba coast after her accident.

"The fishermen arrived with their wives who carried utensils for providing food for the members of the Fishermens Guild, who fully intended taking up their abode on the site of the Y.W.C.A. building until the Osaka Shosen Kaisha would acknowledge their claims. They allege that the damage done to their seaweed and clams amounts to Yen 100,000. The shipping company are willing to pay Yen 2500."

Insurance Class Activities

For the first time in history, the Study Class of the Association of Marine Underwriters in San Francisco, at its meeting of February 9, was addressed by a speaker of the feminine persuasion. The speaker in question was Miss Bathie Stuart, of the Union Steamship Company of New Zealand, who delivered a most interesting address on the topography and sea ports of the islands of the New Zealand group. Miss Stuart's remarks were accompanied by slides showing the diversified scenery of the Islands.

The Class was also addressed by Abraham (Abe) Marks, the marine manager of the San Francisco Chamber of Commerce, who had for his subject the functions of the Marine Department of the Chamber of Commerce. Mr. Marks traced the development of the Marine Department from its early days when visual observation was the only means of acquainting the maritime fraternity with the arrival of vessels, down to the present time when all the facilities of radio and cable communications are employed to keep San Francisco shippers and owners in touch with the movements of vessels all over the world.

Freights, Charters, Sales

March 19, 1931.

THE following steamers have been fixed with grain to U.K./Continent: British str. Madunda, Vancouver, B.C., to Havre and Rotterdam, April, Canadian American Shipping Company; a Reardon-Smith steamer, Vancouver, B.C., to U.K./Continent, 22/6, April, Canadian Cooperative Wheat Producers Association; Norwegian str. Romulus, Vancouver, B.C., to Greece, 25/-, March, Mitchel Grain Co., Ltd.; Swedish str. Roxen, Vancouver, B.C., to U.K./Continent, 22/6, option Portland, 23/9, March, Heatley and Company; British str. Welsh City, Vancouver, B.C., to U.K./Continent, 22/6, April, Canadian Cooperative Wheat Producers Association.

The following steamers have been fixed with lumber to the Orient: British str. Penybryn, Puget Sound to Japan, March, Canadian American Shipping Co.; Norwegian motorship Bronxville, Columbia River to Japan, $6.75, March, Douglas Fir Exploitation and Export Company; Danish motorship Stensby, Columbia River to Nanking and Hankow, March, Dant & Russell.

The following steamers have been fixed with lumber to the Atlantic: American steamer Lake Gorin, Grays Harbor to North of Hatteras, April; American steamer Onondaga, North Pacific to North of Hatteras, $9, April 1, Krauss Brothers Co.

The Danish motorship Stjerneborg has been fixed for time charter one trip, delivery Boston, redelivery North Hatteras via North Pacific, $1.00, by Seaboard Lumber Sales Company.

The following sales have been reported: American tank barge Erskin M. Phelph, Union Oil Co. to Crosby Marine Transportation Co.; American barkentine Kate G. Pederson, Northern Fisheries to Alameda Airport (to be used as breakwater).

PAGE BROTHERS, Brokers.

A Good Maintenance Record

THE twin-screw, passenger and cargo motorship City of New York, built by the Sun Shipbuilding & Dry Dock Company, Chester, Pennsylvania, for the American South African Line, Inc., of New York, has now been in service constantly for over a year and has given a very good account of herself, operating with entire satisfaction to her owners.

This vessel is 470 feet long overall, 61 feet 6 inches beam, and 37 feet depth; with a loaded draft of 26 feet. She is engined with two 4-cylinder Sun-Doxford, opposed-piston, directly reversible, oil engines, each of which develops 2700 shaft horsepower at 100 revolutions a minute. The cylinders of these engines are 23.62 inches in diameter with a combined stroke of 79.12 inches.

At the end of a year's service a very thorough survey of the machinery units and of the hull structure of the vessel was made and everything was found to be in very satisfactory shape. Micrometer measurements were taken both fore and aft and athwartship at 15 points in the length of each cylinder bore on each engine. These measurements show an average wear of 0.0051 fore and aft and of 0.0062 athwartship. These figures show very conclusively that the Sun-Doxford diesel is constructed of very high quality materials and that the design of this engine takes care of lubrication very effectively. It is a well known fact that the first year of operation of a motorship usually causes more wear on the cylinders of the diesel engines than does the next three to five years of operation.

Both the owners and the builders are to be congratulated on this fine ship and the owners should be encouraged in the long distance trade which they are developing and for which this ship was built. Complete, illustrated description of the City of New York and of her machinery will be found in Pacific Marine Review for March 1930.

Trade Literature

General Electric Company, Schenectady, New York, has ready for distribution the following loose-leaf bulletins:

GEA-1117: Solid-shaft, vertical induction motors.

GEA-1247: CR1026 Enclosed starting rheostats for repulsion-induction motors.

GEA-1236: G-E Fabroil gears, strong, quiet, economical.

GEA-1157A: G-E Strip heaters—and a few suggested uses.

GEA-556C: G-E Automatic welding head and control (automatic electrode-feeding device—magnetic-clutch type).

GEA-1202: Type RKS Capacitor motors—single-phase; 60 cycle; constant speed; high power-factor.

GEA-1242: G-E Textolite Gears.

New Worthington Catalogs.—Below is a list of new catalogs, bulletins, etc. released recently by the Worthington Pump and Machinery Corporation.

Diesel Engines, vertical 4-cycle, direct-injection, Type B. Designed for continuous, economical performance covering the 50 to 150 horsepower range. Bulletin S-500-B5, 8 pages.

Horizontal Duplex Piston Pumps, Type S.P., submerged piston side pot pattern with Wompco or cast-steel liquid ends for 450- and 600-pound, respectively, maximum pressure. Specification Sheet W-112-S6, 4 pages.

Horizontal Duplex Piston Pattern Hot Oil Pumps, Type S.P. For hot feed or hot flash service at temperatures up to 700 degrees Fahrenheit. Specification Sheet W-112-S9, 4 pages.

Trade Notes

Moves to Larger Quarters.—The International Compositions Co., Inc., manufacturer of Holzapfel's compositions for ships bottoms, has announced the removal to larger quarters at 21 West Street Building, New York. The new offices are more spacious than those formerly occupied at 25 Broadway. They are on the eleventh floor of the building and overlook the North River.

Acquires Rights to Truss-Weld System.—United Dry Docks, Inc., with head offices at 11 Broadway, New York, has announced the acquisition of the exclusive right on the Atlantic Coast to the Kjekstad Patented Truss-Weld and Reverse Channel systems of ship, barge, and tank construction. It is further announced that J. Kjekstad, formerly president of the Truss-Weld Barge Company, joins the Truss-Weld Division of United Dry Docks as consulting engineer. A. Hudson, formerly vice-president and sales manager of The Truss-Weld Barge Company, becomes sales manager of the Truss-Weld Division.

Gear Company Changes Name.—A firm name that has been familiar in engineering and machinery circles of the West for the past twenty-six years was recently changed to more accurately describe the expanded activities of the organization, when the Johnson Gear Company, of Berkeley, California, became the Johnson Gear & Manufacturing Co., Ltd.

Frank B. Drake, who has been president of the Johnson Gear Company for many years, retains his official position in the enlarged firm. The expansion of the Johnson Gear & Manufacturing Co. Ltd. may be indeed recorded as a forward step in the march of western engineering, indicative of the spirit of achievement.

Boilers and Stills. The Babcock & Wilcox Co. has announced the organization of The Lummus Company to take over the engineering and contracting firm of Walter E. Lummus Company of Boston. The Superheater Company and the Babcock & Wilcox Company hold substantial blocks of stock in the new company and the facilities and experience of these two firms will be of great benefit to the new organization. The Lummus Company will engage in the design and manufacture of distillation and refining equipment for alcohol, chemical, and petroleum industries. Walter E. Lummus is president of the company.

Westinghouse Receives Electrical Contract for Cruiser.—Receipt of an order in excess of $500,000 from the U. S. Navy Department for the main propelling machinery and engine room auxiliaries for a new 10,000-ton treaty cruiser is announced by the Westinghouse Electric and Manufacturing Company. The new vessel designated as No. 38, is yet unnamed and will be built at the Mare Island yard, California. Her four main geared-turbines will deliver a shaft horsepower of 107,000 giving the vessel a speed of 33 knots. The electrical equipment will be a duplicate of that ordered for Cruisers 37, 34, and 36 all being for Westinghouse machinery The cruiser will have a main armament of nine 8-inch guns.

New Line of Lubrication Oils.—Announcement was made March 9 by E. B. Montgomery, manager of lubrication sales for the Associated Oil Company, of the introduction to the Pacific Coast market of a new line of Cycol turbine, compressor, ice machine, and dynamo oils to replace the company's Avon line of products of this nature. The new Cycol products are exactly the same as are now being furnished by the company to the United States Navy for these purposes under its Pacific fleet lubrication contract. This is said to be the first time that any company on the coast has offered for commercial sale the same products of this type which were furnished on a navy contract. Associated is also said to be the only Coast company offering for sale an Edeleanu treated product for these uses. With the marketing of these new Cycol products, all Associated products furnished the navy are now identical with those offered the public.

A Modern Radiator.—The Lalor Electric and Engineering Company of San Francisco has recently been appointed Pacific Coast representative of the Vulcan Radiator Company of Hartford, Conn. The Vulcan Steel Radiator is composed of Vulcan extended surface radiator tubes. These tubes are fitted with radiation fins so designed that whereas six plain 1¼-inch tubes would have an aggregate heat radiating surface of 2.60 square feet per linear foot, a single Vulcan 1¼-inch radiator tube has a radiating surface of 3.25 square feet per lineal foot. This device is very efficient in hot water or steam heating systems on shipboard and commends itself especially in those locations where even distribution of heat is desirable.

De Luxe China Lighting Fixtures.—The Lalor Electric & Engineering Co. is recently in receipt of a supply of the latest Lenox, Incorporated, catalog describing and illustrating the beautiful Lenox china creations for decorative electric lighting fixtures, many of which are especially adapted for marine use.

American Locomotive Afloat.—Announcement has recently been made by W. C. Dickinson, president, that the American Locomotive Company are now to manufacture for direct American distribution the marine specialties devised and perfected by Messrs. J. Stone & Company, Ltd., of Deptford, England. These specialties include ships' port lights and windows and the famous Stone hydraulic and electro-hydraulic water-tight doors.

The manufacturing facilities and experience of the American Locomotive Company will enable them to place these devices on the American market at reasonable prices and at the same time insure that the standard of workmanship and material so long maintained under the name of Stone will be identical in the American product.

H. D. Rohman is sales manager in the marine department.

ERRATA

In the advertisement of The Texas Company, opposite Page 136 of the March issue of Pacific Marine Review, there appears, in reference to the U. S. Army Engineers dredge A. MacKenzie, this statement: "The last time her cylinders were inspected less than 50-thousands of an inch wear was discernible." This is, of course, in error. The statement should have read "less than 5 one-thousands of an inch wear."

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

United States Loadline Commission Guests of Honor in San Francisco

PACIFIC Coast shipping officials and representatives of allied industries, three hundred strong, attended the luncheon in honor of the United States Load Line Commission, on March 20 in the Rose Room of the Palace Hotel in San Francisco.

Norman F. Titus, head of the commission, discussed the application of the load line regulations for merchant vessels of over 250 gross tons. H. B. Walker, president of the American Shipowners' Association of New York, presented a paper entitled "The American Merchant Marine."

Ralph W. Myers, president of the Propeller Club of California, which sponsored the luncheon was chairman of the meeting. Captain Robert Dollar was honorary chairman, but was unable to attend the session on account of a recent illness. The day of the meeting marked Captain Dollar's 87th birthday and all hands stood a moment in felicitation, an impressive tribute called by President Myers.

Under the efficient leadership of Captain Stanley Allen, secretary of the Propeller Club, the general committee on arrangements is to be congratulated on the splendid attendance and entertaining program. Will Crocket, of the San Francisco Junior Chamber of Commerce, was secretary of the committee, which comprised Wilson Meyer, Senior Chamber of Commerce; W. L. Montgomery, Senior Chamber of Commerce; Jack Waddington, Board of Marine Underwriters; Ross Bray, Transportation Club; Jerry Dundon, Junior Chamber of Commerce; Chalmers Graham, Senior Chamber of Commerce; J. P. Williams, secretary of the Pacific American Steamship Association; Nat Levin, secretary, Shipowners Association of the Pacific Coast; D. C. Wilkins, Pacific Traffic Association; Al Mattingly, Pacific Traffic Association and George Williams, Pacific Traffic Association.

The Load Line Committee was headed by Norman F. Titus, president of the American Institute of Shipping of New York. Other members of the committee are: H. B. Walker, president of the American Steamship Owners' Association, vice-chairman; David Arnott, chief surveyor of the American Bureau of Shipping; Rear Admiral J. G. Tawresey, representing the Shipping Board; Robert F. Hand, vice-president, Standard Shipping Co.; S. D. McComb, manager of the Marine Office of America; and Laurens Prior, technical assistant to the Secretary of Navigation, secretary.

Other guests of honor to greet the Load Line Committee were:

D. C. Wilkens, president, Pacific Traffic Association; Bert Anderson, secretary-manager, Pacific Coast Dry Dock Ass'n; W. J. Walsh, commander, C. C. Thomas Navy Post, American Legion; Chas. L. Wheeler, vice-president and general manager, McCormick Steamship Co.; Hon. Wm. B. Hamilton, Collector of Customs for San Francisco; Roger D. Lapham, president, American-Hawaiian Steamship Co.; Geo. A. Armes, president, General Engineering & Dry Dock Co.; Rear Admiral W. C. Cole, commandant, 12th Naval District; F. J. O'Connor, president, Shipowners Association of the Pacific Coast and member Maritime and Harbor Committee, San Francisco Chamber of Commerce; A. J. Cleary, executive secretary of Mayor Angelo Rossi of San Francisco; Chairman Ralph W. Myers, president, Propeller Club of California; R. Stanley Dollar representing his father, Captain Robert Dollar, Honorary Chairman of the luncheon; J. C. Rohlfs, president, Pacific American Shipowners' Association; Col. F. D. Kilgore, chief of staff, representing General Logan Freeland; Frank H. Evers, American Bureau of Shipping; James A. Cronin, Propeller Club of California; Alfred S. Gunn, general manager, Union Plant, Bethlehem Shipbuilding Corp.; Robert Newton Lynch, International Trade Dept., San Francisco Chamber of Commerce; Geo. S. Williams, Foreign Trade Club; Captain B. McAllister, American Bureau of Shipping; Hugh Gallagher, Matson Navigation Company; Ross Bray, president, Transportation Club; Captain A. F. Pillsbury, Tom Andrews, Col. Thos. B. Esty, A. W. Hughes, Captain I. N. Hibberd, David W. Dickie, Captain H. W. Rhodes, Joseph Dolan, Abe Marks, Captain John K. Bulger, Gerald O'Gara, and A. J. Dickie.

H. IWASAKI, son of BARON HIKOYATA IWASAKI, partner in the ownership of the huge Mitsubishi interests, and nephew of the Mitsubishi president, recently left San Francisco for Japan after completing a tour of the United States, South America, and Europe. Iwasaki's six-months tour was for the purpose of inspecting American and European manufacturing and merchandising methods and to visit the far-flung Mitsubishi coffee plantations in South America. While in San Francisco he conferred with officials of the Associated Oil Company in connection with the oil refinery now being constructed jointly by Mitsubishi and Associated in Japan. This is the first modern refinery in the Orient in which American capital is involved. The Mitsubishi executive was extended "bon voyage" by CHARLES R. BROWN assistant to the president of Associated; B. I. GRAVES, general sales manager; RICHARD S. TURNER, export manager; H. DENBIGH ELLIS, assistant export manager; and K. E. KNEISS, assistant sales manager of the fuel oil department. Mitsubishi officials present were S. NOMURA, T. NASU, and CAPTAIN N. HARA.

Official News *of the* PROPELLER CLUB *of* California

2nd. Annual Propeller Club Championship Golf Tournament—Castlewood Country Club, March 12, 1931

Assembled at the beautiful Castlewood layout in the Pleasanton Hills, on Thursday, March 12, members of the Propeller Club of California and their guests enjoyed a wonderful day. Under the able chairmanship of Russ Pratt, the committee composed of W. Edgar Martin, secretary, Herbert J. Anderson, Bill Empey, Tom Crowley, Captain Gerrard January, Vernon Showell, and C. M. Le Count, is to be congratulated on staging the most successful outing event in the history of our rapidly growing organization

Although rain was falling in San Francisco, the spring sunshine was covering the Castlewood range. Many of the players found it comfortable to discard sweaters. The management and staff at Castlewood left nothing undone that would make for the comfort and happiness of the occasion. The golf committee made an excellent move in selecting Castlewood for the event.

Our next golfing event is scheduled for the early fall and will undoubtedly be in the nature of a week-end trip to some country resort.

EVENT	PRIZE	PRESENTED BY	WON BY	SCORE
Low Net	Silver vase	Niderost & Taber	Russ Pratt	82-12-70
Low Gross	Trophy	Dee Furnace Co.	Trev Smith	84- 4-80
Runner Up, Low Net	Silver vase	Associated Oil Co.	B. L. Haviside	86-11-75
CLASS A—Under 15 handicap				
Low Net	Silver vase	Sperry Gyroscope Co.	A. J. Glesener	87- 8-79
Low Gross	Electric clock	Marine Electric Co.	Geo. Schirmer	91-10-81
CLASS B—16 to 18 handicap				
Low Net	Silver vase	General Paint Corporation	Jas. H. Young	97-18-79
Low Gross	Electric clock	Lalor Electric & Eng. Co.	H. J. Anderson	93-17-76
CLASS C—19 to 24 handicap				
Low Net	Silver vase	Brown Bros. Welding Co.	Vernon Showell	98-20-78
Low Gross	Electric Percolator	Standard Oil Co. (Calif.)	Ed. Harms	101-23-78
CLASS D—25 to 30 handicap				
Low Net	Silver vase	Toumey Elec. & Eng. Co.	W. J. Edwards	103-27-76
Low Gross	Sporting goods merchandise order	American Marine Paint Co.	C. C. Mallory	113-30-83
GUEST FLIGHT				
Low Net	Silver vase	Bird Archer Corp.	Capt. Fred Lemon	84- 8-76
Low Gross	Electric percolator	Edison General Electric Appliance Co.	Dr. R. F. Kile	87-11-76

CLASS "A"—15 and Under

Trev Smith	84- 4-80
A. J. Glesener	87- 8-79
Geo. B. Schirmer	91-10-81
B. L. Haviside	86-11-75
Russ Pratt	82-12-70
W .C. Empey	100-14-86
D. H. Duncanson	98-14-84
John Parker	99-15-84

CLASS "B"—16 to 18

J. F. McCone	97-16-81
J. B. Rodger	107-16-91
R. J. Sullivan	103-16-87
H. J. Anderson	93-17-76
R. F. Monges	102-17-85
Jas. H. Young	97-18-79
Ed. B. Egbert	105-18-87
W. J. Lafrenz	102-18-84
Paul Faulkner	100-18-82
Geo. A. Armes	98-18-80

CLASS "C"—19 to 24

F. P. Ritchie	100-19-81
John Greany	104-20-84
Vernon Showell	98-20-78
C. M. Le Count	102-21-81
R. W. Myers	115-22-93
F. C. Kobely	103-22-81
Ed. Harms	101-23-78
Harry Haviside	110-24-86

CLASS "D"—25 to 30

Graham Smith	128-25-103
W. E. Martin	115-25- 90
Geo. Swett	128-25-103
W. J. Edwards	103-27- 76
Frank H. Fox	119-27- 92
A. C. Piercey	124-28- 96
C. C. Mallory	113-30- 83
J. A. Cronin	136-30-106

GUEST FLIGHT

Capt. Fred Lemon	84- 8- 76
O. A. Dunkel	87- 9- 78
Dr. R. F. Kile	87-11- 76
Graham Smith, Jr.	96-11- 85
Frank De Benedetti	90-12- 78
Harvey Huff	95-14- 81
Jack Matthews	95-15- 80
John A. Stein	118-18-100
Lewis Levin	107-18- 89
Wm. Featherstone	97-18- 79
Capt. Leb. Curtis	104-22- 82
C. S. McDowell	102-24- 78
Arthur Foster	116-25- 91
Geo. Kaufman	118-25- 93
L. C. Heller	105-25- 80
Frank Cobbledick	114-27- 87
Glenn T. Hoffman	143-27-116
Ralph Newell	109-27- 82

More than 200 guests attended the Third Annual Banquet of the Bilge Club of Los Angeles on March 7 at the California Yacht Club in Wilmington. The event was one of the most successful affairs in the history of southern California maritime activity. The beautiful ballroom of the club was brilliantly adorned with house flags and nautical trim.

J. C. MacQUIDDY, chairman of the Board of Directors of the club, was general chairman of the third annual indoor cruise. The Bilge Club board comprises H. J. SUMMERS, G. L. SKOEFIELD, S. A. KENNEDY, JR., E. A. MILLS, H. E. PICKERING, P. B. YOUNG, C. A. BECKLEY, secretary, and CHARLES H. BAYLY, treasurer.

Here's Jack Young, Jr., of Honolulu, growing up to follow in his famous dad's footsteps. The great Young Bros. tug fleet in Hawaii holds all of Jack's interest.

For the dinner the special committees were as follows: Reception—J. C. MacQUIDDY, E. A. MILLS, and G. L. SKOEFIELD; Entertainment — HERBERT E. PICKERING; Program — HARRY SUMMERS; Refreshment — B. B. LIPPMAN, A. T. FABEL, and WILLIAM MAGGIO; Decoration—S. A. KENNEDY, JR., and P. B. YOUNG; and for the Dinner—E. R. BRUCKER.

Assembling with the southern California shipping leaders were the following San Francisco officials: George A. Armes, president, and Frank Fox, general manager of the General Engineering & Drydock Company; Millard Hickman, superintending engineer, Matson Navigation Company; James A. Cronin, naval architect and superintending engineer, Standard Oil Company (Calif.); George Zeh, manager, marine department, Associated Oil Company; Al S. Gunn, general manager of the Union Plant, Bethlehem Shipbuilding Corporation, Ltd.; John Greany, sales manager, Bethlehem Shipbuilding Corporation, Ltd.; and Herbert J. Anderson, secretary of the Pacific Coast Dry Dock Association.

Propeller Club Flashes

Both interest and attendance are growing in the recently inaugurated Tuesday luncheon meetings of the Propeller Club of California at the San Francisco Commercial Club.

Harry Haviside entertained the luncheon gathering on March 24 with several reels showing the golfing form of Propellers in the recent Spring Tournament at Castlewood Country Club. "A camera doesn't lie" — ancient Chinese proverb—was rightly interpreted. Booming tee-shots and flubbed pokes—all appeared to bring us awe and laughter. A real treat for both the players and the members who were unable to attend. Truly an historical pictorial!

On March 31, the club was addressed by Captain C. W. Fisher, manager of the Mare Island Navy Yard, on the subject of "Deep Sea Diving."

April 7 the weekly luncheon event will be a film by Transcontinental and Western Air depicting modern plane travel.

On April 14 there will be an address by a guest speaker on a nautical subject; and on April 21, a motion picture will be shown depicting a voyage from San Francisco and Los Angeles Harbor to New York via ports of Central America and Mexico, through the courtesy of the Panama Mail Steamship Co.

Our dear old friend Charles Pratt passed away March 19. He was a wonderful fellow and esteemed by everyone from one end of the waterfront to the other.

We anticipate the arrival of Air Commodore Charles Kingsford-Smith in San Francisco soon and look forward to having this famous globe-circling pilot tell us of transoceanic flights.

Four hundred and thirty-one active members! That's the count of the Propeller roster to date. Recent new members are as follows: C. C. Mallory, Fred Dorwood, Captain I. B. Smith, John H. Thies, Louis Levin, John F. Blain, Jr., and Glenn Hoffman.

WILLIAM GROUNDWATER, manager of transportation of the Union Oil Company since 1923, last month was appointed to the position of director of transportation.

Captain Francis M. Edwards, formerly on the Matson liner Malolo, is now assistant to Operating Manager Hugh Gallagher. He has served on the Matson vessels Manoa, Wilhemina, and Maui; and was master of the Maui when she was serving as a transport during the World War.

In his new post, he is charged with responsibility for all operations of pipe lines and storage, steamships and marine equipment, and tank cars.

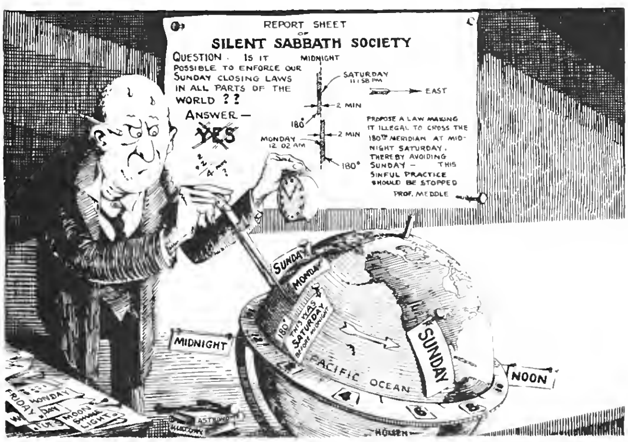
As director of the Producers Transportation Company, director of the Outer Harbor Dock and Wharf Company of San Pedro, director of the Pacific American Steamship Ass'n, director of the Los Angeles Steamship Ass'n, member of the executive committee of the Marine Service Bureau, and in his affiliation with the American Committee of Lloyd's Register of Shipping, Groundwater has taken an active interest in transportation problems and has particularly concerned himself with marine shipping. Groundwater has come up through the ranks during his twenty years service with Union

Harold G. Dillingham, left, of Honolulu, president of B. F. Dillingham Company. Walter F. Dillingham, right, of Honolulu, president of the Oahu Railway Company and the Hawaiian Dredging Company of Honolulu.

Oil Company, his first job being construction work on the Producers Pipe Line at Creston. He later worked at the Creston station pumping plant as engineer and was then brought to San Luis Obispo and placed in charge of the mechanical equipment and personnel of the Producers Pipe Line. He was elected to superintend the operations of the Producers Pipe Line and the newly completed Lompoc Pipe Line in 1913. In 1922 he was chosen assistant manager of transportation and assumed charge of the department the following year. This position he has held until his appointment as Director of Transportation last month.

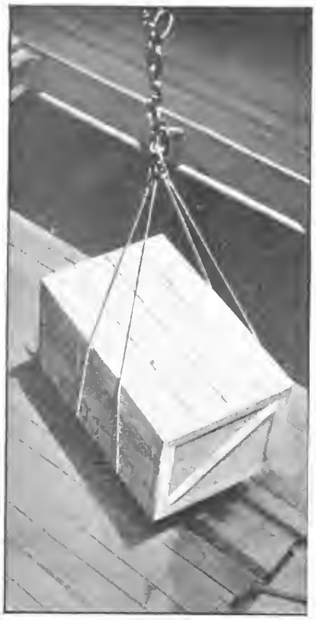
ERIK KRAG, general manager on the Pacific Coast for the Interocean Steamship Corporation, recently announced the appointment of LYNDON B. FITCH as traffic manager of the line, effective March 15. Fitch has had service with several important Pacific Coast Lines, his last position being that of western traffic manager of the Redwood Line, which was merged with the Gulf-Pacific Line. The Interocean Line maintains offices in Seattle, San Francisco, and Los Angeles. Watson S. Barr is Seattle manager.

JOHN E. RYAN, general passenger manager of the Matson Navigation Company, is now in the East for the purpose of amalgamating the interests of the recently merged Matson Line and Los Angeles Steamship Company. Ryan recently returned from Honolulu where he assisted in a similar consolidation of offices at the companies' island terminus. On his return to San Francisco Ryan reported that business sentiment was rapidly improving in Hawaii as evidenced by the Hawaii Tourist Bureau's biennial campaign for the raising of funds to promote travel to the Islands.



Howard Oxsen, noted Propeller Club artist, here depicts Professor Meddle at work in his laboratory, this time figuring out matters for the Silent Sabbath Society. When Howard isn't drawing he's selling Fairbanks-Morse marine equipment in the San Francisco territory. Hope we can get Howard to to be a regular contributor to this part of "PMR!"

Just as easy as lifting a suit-case with one hand



McCormick has perfected the art—it may well be called that—of loading and unloading the most formidable type of cargo. Every ship and dock can furnish every conceivable sort of gear necessary to save time and—most important—assure "good condition" deliveries.

The illustration shows an ingenious handling of tractor parts consigned to Porto Rico. It is well to remember that McCormick provides the only direct steamship service from Pacific Coast ports to the West Indies. Sailings every fourteen days.

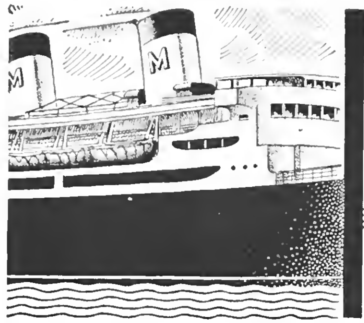
Eliminate worry . . . Ship via McCormick

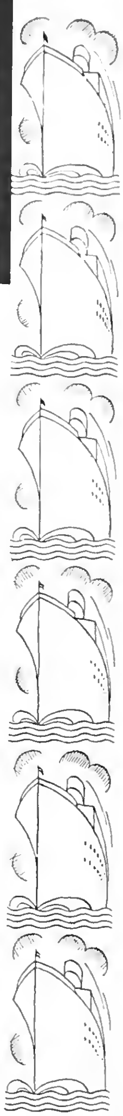
McCORMICK Steamship Company

215 Market St. - - Phone DAvenport 3500

SAN FRANCISCO

Oakland	Los Angeles	Portland	Tacoma
Vancouver, B.C.	San Diego	Seattle	Astoria





FAST SERVICE

..8 Matson liners to Hawaii

THERE'S never any waiting when you want to go to Hawaii. Eight Matson liners, including the luxurious Malolo, plow a continuous wake to and from Honolulu. You can always find a Matson sailing that suits you.

Deck sports, movies, dancing, will enliven your voyage. In your stateroom, you'll find the comforts of home. You can have a great trip on one of these Matson liners from San Francisco's Golden Gate to Honolulu. All-expense tours are offered in great variety.

Gateway to the South Seas

From Honolulu it is not far to Samoa. Beyond Samoa lie Fiji and Australia. You can book on Matson ships all the way—with generous stopovers and everything arranged in advance.

Ride the surf at Waikiki!

Every day in the year, bronzed, happy visitors ride the surf at Waikiki. The average temperature of the water is 75 degrees—just what it should be for comfort.

MATSON LINE

25 steamers . . fastest service

HAWAII - - SOUTH SEAS - - AUSTRALIA

San Francisco	Los Angeles
Portland	Seattle

Quips That Pass in the Night

Voice on Phone: "Do you save young girls?"

"Salvation Army" Dean: "Why, yes."

Voice on Phone: "Well save me a couple of red heads for tonight."

"Feed a cold and starve a fever," say the doctors. What we would like to know is why every girl we take out has a cold instead of a fever.

"How did you begin life?" the young man asked the great man.

"I didn't begin it," truthfully replied the great man. "It was here when I got here."

A pretty girl wearing the very latest in bathing suits was sitting on the bench when a young man approached her and took off his hat remarking that it was a fine day.

"How dare you speak to me!" said the girl indignantly, "I don't know you from Adam."

"Well," returned the young man unconcernedly, "I would hardly know you from Eve."

The minister's sermon had been on "The Beautiful Features of Married Life."

As two stout ladies waddled away from church one said, "His rivirence preached a foine sermon."

"Yis," said the other, "and I wish I knew as little about the subject as he does."

Tourist (at a country hotel)—Can my wife and I have a room with a shower?

Proprietor—Waal, I can give you a room that leaks, but I'm ding busted if I can guarantee rain.

Teacher—"Can anyone tell me what 'hence' means?"

Little Abie—"Please, Miss, poultry."

The plumber rang the bell, and, as it happened, both the Master and Mistress of the house came to the door. As they stood in the hall, the husband, who was very methodical, said:

"I wish, before we go upstairs, to acquaint you with the trouble."

"I'm very pleased to meet you, mum," said the plumber.

A woman is said to have a capital figure when it draws a lot of interest.

"Statistics show," declared the bespectacled woman lecturer, "That the modern, common-sense style of women's dress has reduced accidents on the street cars by fifty percent."

"Why not do away with accidents altogether," piped a masculine voice from the rear of the hall.

Change.

Before Marriage—You're so different from other men.

After—Why can't you be more like other men?

"Where did you get those big, tender, sympathetic eyes?"

"Oh," replied the sailor, "they came with my face."

Judge—"What is the charge, officer."

Officer—"Driving while in a state of extreme infatuation."

A schoolmaster was lecturing to a class upon the circulation of the blood.

"If I stand upon my head," said he, "the blood will run down to my head, will it not?"

"Yes, sir," assented the boys.

"Then," said the master, "why does the blood not run into my feet when I stand on my feet?"

There was a pause for a few minutes, when a bright youth replied, "Please, sir, it's because your feet ain't empty."

Hostess (discussing wedding of acquaintance who has married beneath him): "Was the bridegroom's family well represented at the ceremony?"

Visitor: "No. As a matter of fact, I believe it was a great relief when he himself turned up!"

Eloping Girl: "Papa will be unstrung."

The Groom: "That's all right, dearest, we'll wire him."

Joe, the American, and Sandy, the Scot, were spending a holiday looking at the sights of New York.

After a while they came to a teashop and decided to go in and have tea.

"Well" said the American, when the tea was forthcoming, "you be mother and pour out the tea, Sandy."

"Ay mon," said the Scot, "if ye'll be father and pay for it."

A Simple Remedy.

Billy—"I tell you what it is, Jimmy. Life is a complex mixture of irreconcilable contrariness."

Jimmy—"Just so. I've had it myself. Take her a box of chocolates tonight, and you'll be all right."

"Let me tell you old man—when you get home say quite calmly to your wife exactly where you've been. That's the best thing."

"Oh, is it? Well, what's the next best?"

Yeah, Who is He?

The professor was delivering the last lecture of the term. He told the students with much emphasis that he expected them to devote all their time to preparing for the final examination.

"The examination papers are now in the hands of the printer," he concluded. "Now, is there any question you would like answered?"

Silence prevailed for a moment, then a voice piped up:

"Who is the printer?"

Contralto is a low kind of music sung only by women.

He Should Be in Bonds

"You seem to be able-bodied and healthy," she remarked coldly, "You ought to be strong enough to work for your meals."

"True enough, lady," he replied. "And you seem beautiful enough to be in the movies, but evidently you prefer the simple life."

The dinner was delightful.

Feel Happier?

Come-to-Grief Airman— I was trying to make a record.

Farmer—Well, you've made it, sur; you be the first man in these parts who climbed down a tree without having to climb up it first.

Lessee Yer License

Policeman (leaping out of the way) —Do you know anything about traffic rules?

Sweet Young Thing—Yes. What is it you want to know?

An adult is a person who has stopped growing at both ends and started growing in the middle.

BUYERS' GUIDE AND MARINE DIRECTORY

Mooring Fixtures and Engines.
Dake Engine Company
Hyde Windlass Company.
Motors
Diehl Manufacturing Co.
Motors, Electric.
B. F. Sturtevant Company
General Electric Company.
Westinghouse Elec. & Mfg. Co
Multicoil Evaporators, Heaters, Distillers.
Griscom-Russell Company.
Multiwhirl Oil Coolers.
Griscom-Russell Company.
Nautical Instruments.
Ford & Geirrine, C. V. Lane.
The Sperry Gyroscope Company.
Naval Architects.
D. W. Dickie.
Nipples.
The Lunkenheimer Company.
Nitrogen, Gas.
The Linde Air Products Co.
Marine Repairs (Electrical).
Ets-Hokin & Galvan.
Metallic Packing.
(See Packing.)
Meters, Water and Oil.
Worthington Pump & Machinery Corporation.
Oakum.
Geo. Stratford Oakum Co
Weeks-Howe-Emerson Company.
Oil.
(See Lubricants.)
Oil Burners.
The Babcock & Wilcox Co.
Coen Company.
Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane.
W. S. Ray Mfg. Co.
Vaughn, G. E. Witt Co.
Oil Burning Installations.
The Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Coen Company.
Ford & Geirrine, C. V. Lane.
W. S. Ray Mfg. Co
Vaughn, G. E. Witt Co.
Oil Burning Control Systems.
Vaughn, G. E. Witt Co.
Oil Burning Pump and Heater Sets.
Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane.
Chas. C. Moore & Co., ENGINEERS.
Western Engineering Company.
Vaughn, G. E. Witt Co.
Oil Coolers.
Davis Engineering Corporation.
The Griscom-Russell Company.
Western Engineering Company.
Oil Cups
The Lunkenheimer Company.
Oiling Devices.
Ford & Geirrine, C. V. Lane.
The Lunkenheimer Company.
Oil Fuel.
Associated Oil Company.
Standard Oil Company.
Shell Oil Company.
The Texas Company.
Union Oil Company.
Oil Fuel Apparatus.
Babcock & Wilcox Co.
Coen Company.
Chas. C. Moore & Co., ENGINEERS.
Ford & Geirrine, C. V. Lane.
Vaughn, G. E. Witt Co.
Oil Gauges
The Lunkenheimer Company.
Oil Purifiers.
De Laval Separator Company.
Sharples Specialty Company.
Oil Reliquification Systems.
Davis Engineering Corporation.
Western Engineering Company.
Oil Separators.
Bethlehem Shipbuilding Corp., Ltd.
De Laval Separator Company.
Ford & Geirrine, C. V. Lane.
The Babcock & Wilcox Co.
Sharples Specialty Company
Western Engineering Company.
Oil, Steam Cylinder.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co
The Texas Company.
Oil, Turbine.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co
The Texas Company.
Union Oil Co.
Oronite Paints.
Standard Oil Company.
Oxy-Acetylene Apparatus.
Oxweld Acetylene Company.
Oxygen, Gas
Linde Air Products Company.
Packing
France Packing Co.
Plant Rubber & Asbestos Works.
C. E. Rhodes Co.
Thorkote Products Co., Inc.
Packing, Metallic Condenser
Crane Packing Company.
Packing, Metallic.
Crane Packing Company.
Paint.
Federal Comp. and Paint Co., Inc.
L. W. Ferdinand Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.
Paint, Stack.
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand & Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.
Paint, Waterproof.
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand & Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.
Paneling.
Haskelite Mfg Corporation.
The Pantasote Company, Inc.
Pipe Unions.
The Lunkenheimer Company.
Plumbing, Marine
A. B. Sands & Son Co.
Plumbing (Fixtures), Enameled, Vitreous China, Brass.
A B Sands & Son Co.
Propellers.
Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane.
Hyde Windlass Company.
Warman Steel Casting Co.
Presses.
(See Forging Presses.)
Propeller Shaft Sleeves.
The Paper & Textile Machinery Co
Pumps.
Davis Engineering Corporation.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
Hyde Windlass Company.
Ingersoll-Rand Co.
Kearfott Engineering Co., Inc.
Northern Pump Company.
Western Engineering Company.
Worthington P. & M. Corp.
Pumps, Ballast.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation.
Pumps, Bilge.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation
Pumps, Boiler Feed.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.
Pumps, Centrifugal.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corporation.
Pumps, Circulating.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.
Westinghouse Elec. & Mfg. Co.
Pumps, Deck.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.
Pumps, Electric.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.
Pumps, Electric-driven.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company
Worthington Pump & Machinery Corporation
Pumps, Fuel Oil.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Vaughn, G. E. Witt Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.
Pumps, Gasoline.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.
Pumps, Hand Oil.
The Lunkenheimer Company.
Pumps, Oil.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.
Pumps, Rotary.
Ford & Geirrine, C. V. Lane.
Northern Pump Company.
Vaughn, G. E. Witt Co.
Worthington Pump & Machinery Company.
Pumps, Sanitary.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation.
Pumps (Vacuum).
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
The Sperry Gyroscope Company
Worthington Pump & Machinery Corporation.
Purse Seines.
Cunningham, Allan.
Purifiers.
Ford & Geirrine, C. V. Lane.
Radio Apparatus.
Radio Marine Corp.
Mackay Radio Tel Co.
Ets-Hokin & Galvan.
Reducing Gears.
(See Gear.)
Refined Oils.
Associated Oil Company.
Standard Oil Company.
The Texas Company.
Refrigerating Machinery.
(See Ice Machines.)
Regulators (Pressure).
Vaughn, G. E. Witt Co.
Riggers.
Rings, Piston.
Kearfott Eng. Co., Inc.
Haviside Company.
Roofing Paints.
L. W. Ferdinand & Company.
Rope.
(See also Wire Rope.)
Columbian Rope Company.
Durable Wire Rope Company.
Griscom-Russell Company.
Portland Cordage Co.
Tubbs Cordage Co.
Rudder Angle—Indicator.
Chas. J. Henschel Co.
Lalor Electric & Eng. Co.
The Sperry Gyroscope Co.
Running Light Panels.
General Electric Company.
Sails.
Haviside Company.
Scuttle Butts.
Brunswick-Kroeschell Co.
Frick Company.
Searchlight Control Gear.
The Sperry Gyroscope Company.
Searchlight, High Intensity.
General Electric Company.
The Sperry Gyroscope Company.
Searchlights (Low Intensity).
Ets-Hokin & Galvan.
General Electric Company.
Separators (Steam, Air & Oil).
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
The Babcock & Wilcox Co.
Ship Agents and Brokers.
Page Brothers.
Bethlehem S. B. Corp., Ltd.
Ship and Boat Builders.
Bethlehem S. B. Corp., Ltd
Morse Dry Dock & Repair Co.
Sun Shipbuilding Co.
Todd Dry Docks Corporation.
Ship Bottom Paint.
Federal Comp. & Paint Co., Inc.
International Compositions Co.
Ship Construction Systems.
J. W Isherwood.
Ship Lighting.
(See Electric Fittings and Supplies.)
Ship Chandlers.
(See Hardware and Ship Chandlery.)
Soot Blowers.
Diamond Power Specialty Corp.
Springs.
The Simmons Company.
Steam Engines.
(See Marine Engines.)
Steamship Companies.
(See Transportation.)
Steam Specialties.
Griscom-Russell Company.
Kearfott Engineering Company.
The Lunkenheimer Company.
Vaughn, G. E. Witt Co.
Steam Traps.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane.
Vaughn, G. E. Witt Co.
Steering Gears and Engines.
Bethlehem S. B. Corp., Ltd.
Cunningham, Allan.
Dake Engine Company.
Ford & Geirrine.
Hyde Windlass Company.
Steering Wheels.
Dake Engine Company.
Ford & Geirrine, C. V. Lane.
Hyde Windlass Company.
Storage Heaters.
Davis Engineering Corporation.
Western Engineering Company.
Superheaters
The Babcock & Wilcox Co.
Surface Condensers.
Ingersoll-Rand Co.
Westinghouse Elec. & Mfg. Co.
Worthington Pump & Machinery Corporation.
Switchboards.
Ets-Hokin & Galvan.
General Electric Company.
Westinghouse Elec. & Mfg. Co.
Switches (Electric Snap).
General Electric Company.
Westinghouse Elec. & Mfg. Co.
Teakwood.
East Asiatic Company, Ltd.
Telegraphs, Electrical and Mechanical, Docking, Engine Order, Engine Revolution, etc.
Chas. J. Henschel Co.
Lalor Electric & Eng. Co.

Pacific Marine Review

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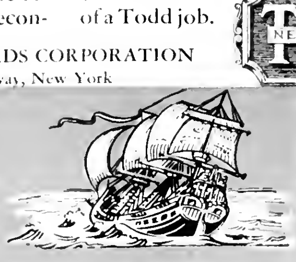

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | MAY, 1931 | NUMBER 5

Contents

Official Organ
Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

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Official Organ
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(Courtesy of Tubbs Cordage Company, San Francisco)

Looking North across the Golden Gate from San Francisco, March 28, 1931. The New Tug Mamo Outbound in center, Towing Two Steel Barges. Mile Rock Lighthouse at left. Mamo and her tow made Honolulu, 2100 miles, in 10 days, 15 hours, and 10 minutes

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Editorial Comment » » »

Reviving the Triple

THE good old triple expansion, reciprocating steam engine has many friends who are constantly devising ways and means to keep that reliable prime mover up to date and on the job in the world's merchant marine. The latest scheme comes from Sweden, where the Lindholmen-Motala Company, which has specialized in Lentz poppet valve marine steam engines for several years, has now added to its engine an exhaust turbo-generating set combined with electric regenerative intermediate superheating. This system is said to realize a fuel consumption as low as one pound of ordinary steaming coal per indicated horsepower hour for all purposes.

This system is now in operation in the Swedish steamer Trione, a 260-foot 2800-ton deadweight capacity vessel powered with a triple expansion engine $17\frac{1}{4}$ inches by $28\frac{3}{4}$ inches by $45\frac{1}{4}$ inches, and $31\frac{1}{2}$-inch stroke, taking steam at 200 pounds pressure and 575 degrees Fahrenheit from two Scotch boilers, and developing 1000 indicated horsepower at 100 revolutions per minute. This engine exhausts at approximately 4.2 pounds (abolute) back pressure through an oil separator into a low pressure turbine which in turn exhausts into the condenser. This turbine runs at 3070 revolutions a minute, driving a generator through reducing gears at 1000 revolutions per minute. A small part of the generator load is used for electric auxiliaries, the bulk of the generator output going to the electric superheater, which regenerates the steam between high and intermediate pressure cylinders.

On trials, the Trione made the equivalent of $10\frac{1}{2}$ knots at a fuel consumption that seems to indicate a performance of $7\frac{1}{2}$ tons coal a day for all purposes.

The Trione is a new vessel with form carefully designed for high propulsive efficiency and fitted with a Simplex Balanced Rudder. Her performance at sea, both as to fuel economy and as to maintenance of electrical equipment will be observed with great interest.

American Shipbuilding Position

DURING the last calendar year, merchant vessels were launched in the world's shipyards representing a larger volume of tonnage than that launched during any year since 1921. This was nearly 100,000 gross tons larger than in 1929, but was almost 350,000 gross tons less than in 1913. For the first time in world shipbuilding history, the tonnage of motorships launched exceeded the combined tonnage of all other types launched.

The total tonnage launched was 2,889,000 gross. Of this total, Great Britain and Ireland accounted for 1,478,563, or a little over 50 per cent., which is 44,000 gross tons less than their total for 1929. The United States launched 246,687 gross tons in 1930, which is 120,664 gross tons more than were launched by our yards in 1929. This is a gain of almost 100 per cent. and accounts for the fact that the United States moved up from fifth to second place among the world's shipbuilding nations. The balance of the world showed a gain of about 20,000 gross tons, on a total of 1,164,222 gross, or less than 2 per cent.

The position of the United States among shipbuilding nations will show continued improvement in 1931 and, with a little encouragement to shipowners for the building of modern fast cargo carriers, that position should become consolidated and be maintained for many years to come.

A Ship Repair Record

THE Union Plant of the Bethlehem Shipbuilding Corp., Ltd., is justly proud of the record recently made in prompt and efficient repairs to the Richfield oil tanker Tamiahua.

This vessel, stranded on the California Coast, was salvaged by Merritt, Chapman & Scott Corporation on a "No Cure—No Pay" basis and contract for renewing practically her entire bottom was awarded to the Bethlehem Union Plant at San Francisco. Such tasks are all "part of the day's work" at the Hunter's Point Dry-Dock of the Union plant; and when asked for particulars the plant issued the following very simple statement, or log, covering the detials of operations:

On dry-dock for survey	November 27, 1930.
Contract awarded (with guarantee to finish in 115 calendar days)	December 3, 1930.
Work commenced	December 4, 1930.
Left dry-dock, 6:30 A.M.	February 18, 1931.
Left yard, 1:30 P.M.	March 3, 1931.

This shows 90 calendar days to complete the work, effecting a saving of 25 days of the vessel's time for the owners. During this period the following work was performed:

New shell plates	140
Plates cut, fair, and return	39
Plates faired in place	35
Total shell plates treated	214
Total number of rivets driven	196,661
Number of oil-tight or water-tight compartments tested	48
Centerline bulkhead plates renewed	9
Athwartship bulkhead plates renewed	11
Longitudinals renewed, approximately	250
Transverse frames renewed	37

No night shift work and no work on Saturday afternoons or Sundays was performed.

This job was one of the largest single ship repair operations ever carried out on the Pacifc Coast.

New Lightship Rides Gale

RIDING to one hundred and forty three fathoms of steel chain in a sixty-five mile gale, broadside to heavy seas, but duty bound to remain on station so long as that was physically possible, Swiftsure Bank Lightship, one of Uncle Sam's newest lightships on the Pacific Coast, proved itself an excellent sea boat. Radiograms from the ship indicated that she was withstanding the terrific pounding exceptionally well, and gave an inkling of life on board this guardian of the entrance to the Strait of Juan De Fuca and Puget Sound.

At the height of the storm the captain of the lightship radioed "Wind southeast force nine (56 miles an hour), rough, several seas breaking over the vessel with minor damage, heavy rain and thick weather, diaphone and radiobeacon operating continually."

A later report read: "Wind southeast, force ten (65 miles), sea rough and heavy, rolling and pitching considerably, cook sustained minor injury, dishes broken."

Still later: "Vessel riding broadside to seas, one sea boarded vessel and went over the pilot house, water filied diaphone horn, it took five minutes before horn was cleared and again operating satisfactory."

Swiftsure Bank Lightship is one of six new lightships recently built. She is equipped with a diesel-electric power plant, for operating all her signalling devices and for propelling the ship.

A Trio of Old-time Deepwater Cronies

By F. C. Matthews

THE accompanying view, made from a photograph something over forty years old, shows, from left to right, Captains Peleg B. Nichols, George A. Carver, and Andrew S. Pendleton. All belonged to Searsport, Maine, were close friends, and never missed an opportunity to get together.

Captain Nichols was born in 1836 and went to sea at an early age in vessels owned and commanded by Captain Jonathan C. Nickels, among which was the Moonlight. When Captain Nickels retired from active sea life to devote his whole time to his shipping interests, he made Captain Peleg Nichols master and in 1876 had the ship R. R. Thomas built for him to command. Except for two voyages when he remained ashore for a vacation, Captain Nichols was in the R. R. Thomas 17 years. He was taken sick on board the ship during a passage from Hong Kong to New York in 1893 and died the day after the ship put into Mauritius for medical assistance.

Captain George A. Carver started life as a ship carpenter in the yard of his father, John Carver, Searsport, and in 1864 succeeded to the business. During the following 12 years he launched a number of barks and brigs and the ship Clarissa B. Carver, which vessel was his last production. He then took up seafaring and was in command of the brig Amy A. Lane, which he, himself, had built, and the Newburyport-built bark Albert Russell. Later on he retired from sea life to start a ship chandlery business in New York as Baker, Carver & Co. the firm also owning interests in different vessels. It became a very important concern and still continues as Baker, Carver & Morrill.

Captain Andrew S. Pendleton's early commands were the barks Thomas Fletcher, Trovatore, and Emma T. Crowell. Later he had the ships Emily F. Whitney and Aryan, the latter being the last full rigged wooden vessel built in this country.

The diesel tug Mamo on her trials on San Francisco Bay.

The "Big Chief" of Towboats

The Diesel-engined Ocean-going Tug Mamo Delivered to Young Bros. of Honolulu by the Union Plant of the Bethlehem Shipbuilding Corp., Ltd.

IN the soft, musical Hawaiian tongue there are many words connected intimately with Polynesian Mythology and tribal customs. Mamo is one of these words, and its meaning is "Chief of Chiefs," the big chief, the top man, a superior being, or what you will along the line of being something or somebody that stands out as being the best. This name is very aptly chosen by Young Brothers, Ltd., of Honolulu to designate the steel tug recently built for them at the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., at San Francisco. Among the tugs of the Pacific Coast certainly this craft stands out as a "chief of chiefs" in power, in finish, in comfort, in arrangement of towing gear, and in beauty.

For more than thirty years Young Brothers, Ltd., under the direction of J. A. Young, first vice-president and general manager, have covered the Territory of Hawaii in the following services: Towing, fireboat, barge, customs, and immigration, territorial pilot, freighting, and dredge tending. In these services they maintain a fine fleet of seven ocean tugs, seven towing launches, one freight boat, one fireboat, and numerous deepsea barges, both wood and steel.

The bulk of their towing work is open, deep-sea service between the islands, and this work has developed in their personnel and management a remarkably efficient technique in handling heavy deep-sea tows. The Mamo, built under the personal supervision of J. A. (Jack) Young, incorporates in her arrangements for handling towing gear all the acquired experience of this long service.

This tug is the first steel hull tug that Young Brothers have built, and the seventh of their fleet to be powered with Fairbanks-Morse diesel engines.

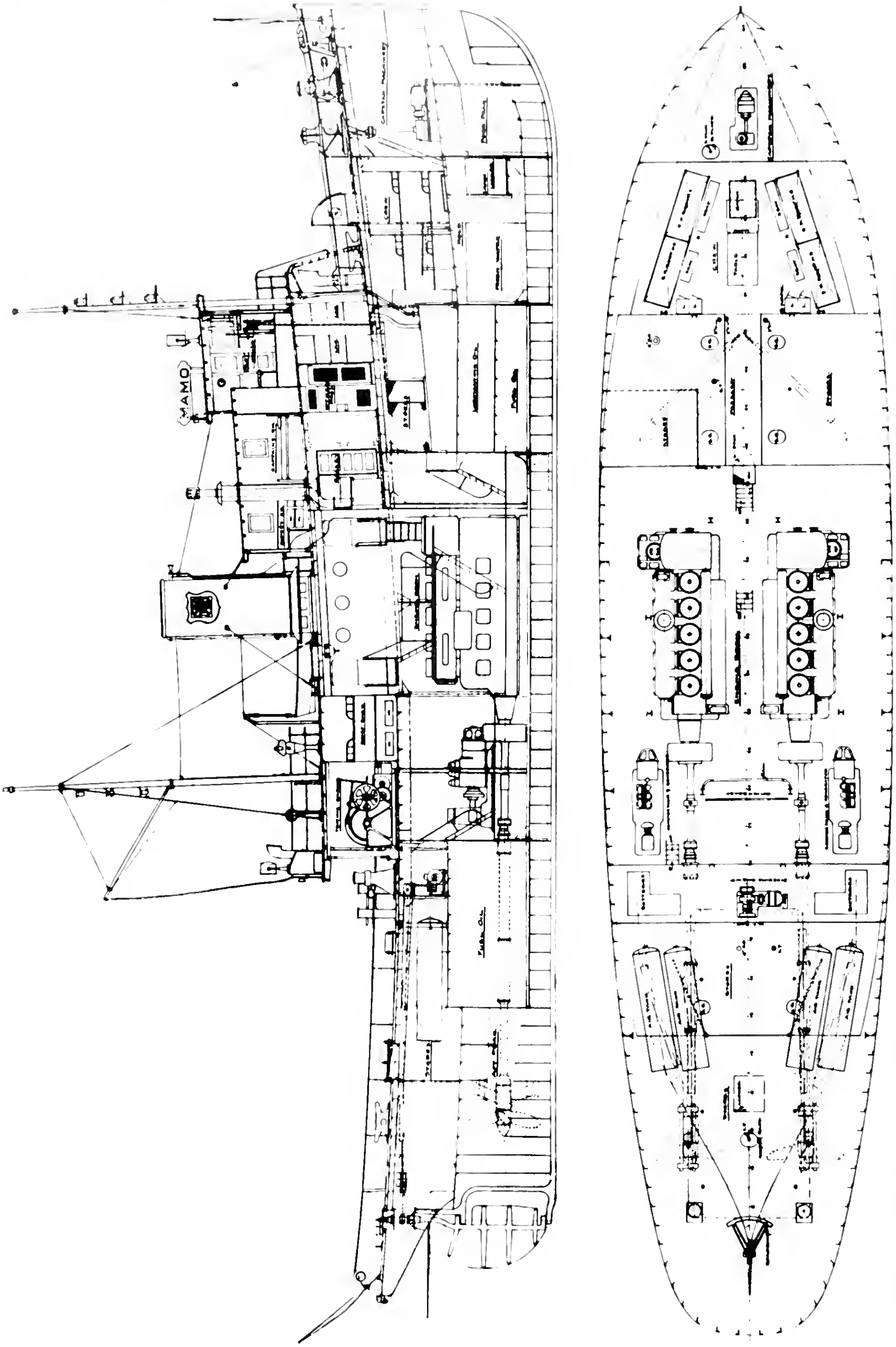
Her principal dimensions are:

Length over-all	129'2"
Length between perpendiculars	120'0"
Beam molded	28'0"
Depth molded	15'2"
Depth lowest point sheer	14'7"
Draft light, forward	8'6"
Draft light, aft	10'10"
Draft loaded, forward	11'6"
Draft loaded, aft	12'6"
Displacement, light, tons	413
Displacement, loaded, tons	575
Gross measurement, tons	332 73
Net measurement, tons	28.00
Forepeak fresh water tanks, tons	14.7
Forward fresh water tanks, tons	12.7
Fuel oil tanks, forward, barrels	572
Fuel oil tanks aft, barrels	413
Afterpeak ballast, tons	16.3

From the bronze roller chocks set neatly into the teak rail at her bow to the Timken roller-bearing-mounted hawser roller at her stern, every point of the Mamo's hull, superstructure, and machinery installation is finished in that shipshape fashion for which the Union Plant of the Bethlehem Shipbuilding Corporation has long been famous.

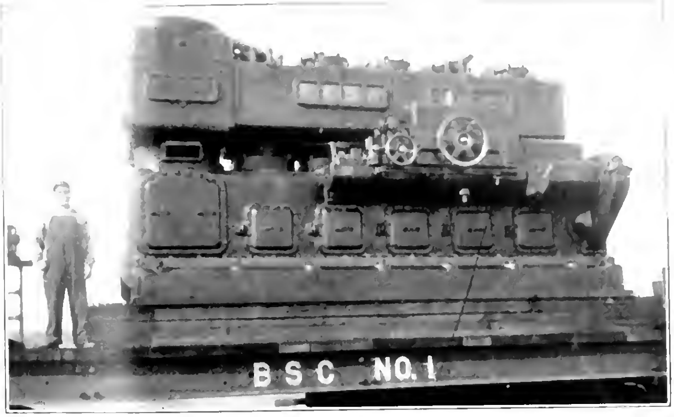
Propulsion Plant

The Mamo is a twin-screw tug, and each propeller shaft is directly driven by a 5-cylinder, 750-shaft h.p. Fairbanks-Morse, Model 37, pump scavenging, diesel engine. Each of these engines is equipped with built-in auxiliary units, as follows: Air compressor, water circulating pump, bilge pump, fuel transfer pump, cylinder wiper oil transfer pump, and lubricating oil

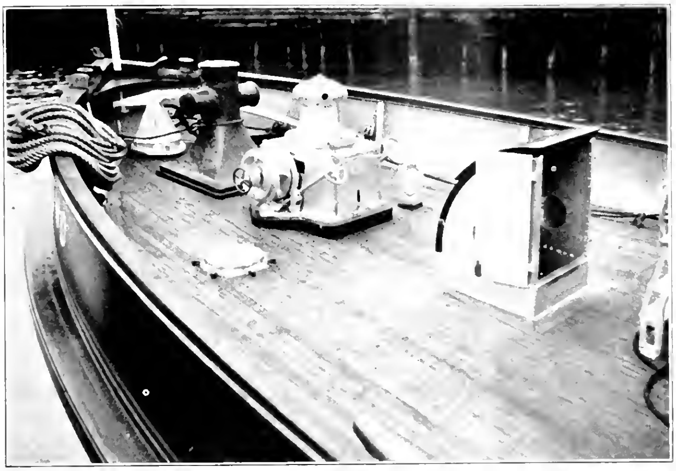


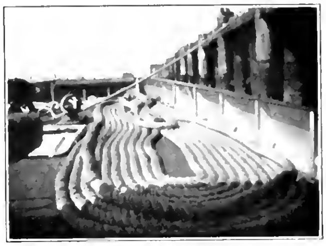
Inboard profile and underdeck general arrangement plan of the tug Mamo.

Some Views on the New Steel Motor Tug Mamo



One of the Mamo's 5-cylinder, 750-brake-horsepower, Fairbanks-Morse diesels ready to be installed in the hull.





At left, forward deck of Mamo featuring specially designed Cunningham electric combination windlass and capstan.

Above, 125 fathoms of Tubbs Supercore 12-inch Towing Hawser laid out on the after deck of the Mamo.

Below, after deck of the Mamo from the top of deck house; the hawser roller is equipped with Timken roller bearings.

The Cunningham electric towing engine of the Mamo, claimed to be the largest installed on any tug.

pump. Features of this model engine are: Oil-cooled pistons, high pressure fuel injection, single stage combustion, and the use of wiper rings at the lower ends of the cylinder liners to prevent carbon tainted piston lubricating oil from entering the crank case.

In connection with this latter feature, this wiper oil from the cylinder is transferred by a special built-in pump to a separate tank, from which it is drawn at intervals for purification by a Sharples 5A centrifuge operating in conjunction with a 6-kilowatt Bayonne type electric oil heater.

Lubricating oil sufficient for long periods of operation is carried in the engine crank case from which it is force-pumped through a Schutte-Koerting oil cooler and then back through the main bearing header, through the drilled crank shaft and up to the piston pins through drilled connecting rods; and so returns to the crank case after passing through individual thermometer wells.

The control board of each engine is equipped with a Brown Instrument Company exhaust temperature indicator and a Weston electric tachometer. A Kingsbury thrust bearing is built into the frame of each engine. The propellers are 92 inches diameter pitch, solid 4-bladed bronze wheels of Coolidge design. For after cooling and emergency use, a rotary lubricating oil pump and a centrifugal circulating water pump, each driven by a 7½-horsepower motor, are installed. These pumps are interconnected to serve both engines.

Power for electrical engine room and deck auxiliaries is provided by two 45-horsepower, 3-cylinder, diesel engines, each directly connected to a 30-kilowatt, 125-volt, compound-wound Fairbanks-Morse direct-current generator and clutch-connected to a 2-stage, 50-cubic feet capacity Fairbanks-Morse air compressor. This plant is supplemented by the installation of an Edison 100-cell storage battery unit, with 200-ampere-hour rating.

All electric circuits are controlled from the main switchboard, built by the Electrical Department of the Union Plant of Bethlehem Shipbuilding Corporation and equipped with Weston voltmeters and ammeters, Roller-Smith circuit breakers, and Trumbull switches.

For general and fire service a 2½-inch, 2-stage, centrifugal pump is provided, direct-connected to a 20-horsepower motor; and for bilge service a 1½-inch, centrifugal pump, driven by a 2-horsepower motor. Fresh water pressure is maintained by a 600-gallons-per-hour plunger pump, vee-belt driven by a ½-horsepower motor. Both pumps and motors are Fairbanks-Morse.

The care taken to make this machinery installation and the sanitary and comfort arrangements on the Mamo as complete and as permanent as possible is indicated by the fact that all piping is in Toncan Iron, the corrosion-resistant copper, molybdenum, iron alloy manufactured by the Republic Steel Corporation. Over fifteen tons of this pipe are used for the various services aboard. All valves are Powell.

On trial runs over the navy measured mile on San Francisco Bay this machinery functioned perfectly, driving the hull at an average speed of 11.4 knots at engine speed of 270 revolutions per minute.

As is well shown in the plans herewith, the engine room of the Mamo allows ample space for all the machinery, which is so installed as to give maximum accessibility for attention and repairs and easy air passage for good ventilation.

Navigation Equipment

Cory mechanical engine room telegraphs are installed with transmitters both in the pilot house and on the after end of the deck house. Two Sperry 18-inch incandescent searchlights are installed, one on top of pilot house with manual control inside the pilot house and one at the after end of the top of the deck house. This latter is of the spot type and is used for picking up tows. These searchlights are each of 1,000,000 beam candle power and are the same as will be installed on the new Dollar, Matson, and Panama Mail liners, and on practically all new construction in American shipyards. Binnacles, compasses, and chronometers were supplied by the Louis Weule Company of San Francisco.

The steering gear, supplied by Allan Cunningham, is arranged for hand steering from the pilot house or for electric telemotor control of the electric steering engine. The change to hand steering is effected simply by removing a pin in the pilot house gear. The rudder is of the balanced type, and a tiller indicator is arranged over the rudder stock on the deck aft, so that the exact position of the rudder is indicated constantly. As will be noted in the illustration showing the stern of the Mamo in dry-dock, the rudder is of unusually large area for a vessel of this size.

A Cunningham air whistle No. 2, specially designed with long horn to give a low, penetrating note resembling that of the best steam whistles, is mounted on the stack with control in the pilot house.

The combination electric capstan-windlass is of a design made especially for Young Brothers by Cunningham of Seattle. It is operated through a vertical shaft by a 20-horsepower General-Electric motor located in the forepeak below the deck. This design of windlass has proved itself a very satisfactory machine on several Young Brothers tugs.

Towing Gear

The Mamo's towing hawsers are served by an Allan Cunningham towing machine—the largest commercial electric towing machine ever installed on any tug. As will be noted from the illustration, this is housed in a recess at the after end of the deck house. The drum of cast steel has a capacity for 1600 feet of 1-5 8-inch steel wire towing hawser. All shafts are of nickel steel. All gears, frame, bed plate, and every part taking strain, with the exception of the gypsies, are of high quality cast steel. This towing machine is operated by a specially wound General Electric 50-horsepower motor that is capable of taking fully 100 per cent. overload for short periods without overheating.

In every detail the towing gear of the Mamo shows care in design and installation. The roller chocks forward are of cast bronze, highly finished in way of rope wearing surfaces. The bitts are of Columbia cast steel, designed with nicely rounded shoulders and large fillets to reduce wear and internal strain on hawsers. The cleats are also of cast steel, similarly designed. A beautifully fitted pine deck is laid over the entire main deck.

Wire hawsers for the Mamo are Broderick & Bascombe, specially made "yellow strand power steel."

In addition to the wire, the Mamo carries Tubbs Manila cordage as follows:

125 fathoms 12-inch Supercore tow line.
125 fathoms 9-inch Supercore tow line.
Several coils 6-inch Supercore hawser.
Running gear and small rope of Super Extra Manila.

Young Brothers, Ltd., have proved to their satisfaction that the extra wear obtained by using Supercore hawsers makes this equipment an economy.

Crew Accommodations

The comfort of officers and crew is well cared for on the Mamo. Aft of the pilot house are two beautifully fitted staterooms, one for the captain and the other for the owner. In the forward end of the deck house on the port side is a nice stateroom with two berths for the mates; and on the starboard side, the officers' mess. Aft of these rooms is a compartment housing the galley on the starboard side and the crew's mess port side. The galley is equipped with a Triktop oil-burning range manufactured by the B. B. Buell & Company of Seattle and with a Frigidaire refrigerator. Between the after end of the engine room and the forward end of the towing engine room there is a nice stateroom and office for the chief engineer and crew and officers' washrooms.

The crew has a large room below the main deck forward, reached by passageway from the engine room or by companion from the deck. This is fitted with eight galvanized pipe standee berths, a table, and individual steel lockers for each man, these latter furnished by Worley & Company of Los Angeles. This room has an air of spaciousness and good ventilation not usually found in a tug's forecastle due to the construction of the fuel and lubricating oil tanks, the tank tops of which are about four feet below the deck and so leave a clear space of that depth for the full width of the hull and extending from the after end of the crew's quarters to the forward bulkhead of the engine room.

The Mamo is using Shell diesel fuel and her lubricating oil tanks are filled with the special diesel engine oil refined by the Dearborn Chemical Company.

Along with this super-tug, the Union Plant of the Bethlehem Shipbuilding Corporation built for the same owners two steel barges, 175 feet long by 44 feet beam by 11 feet depth. On March 28, the Mamo, with these two barges in tow left for Honolulu in charge of Captain Robert Purdy, the ranking skipper of the Young Brothers' fleet and one of the most efficient towboat navigators on the Pacific. Edward P. (Ned) Green and Howard Oxsen represented Fairbanks, Morse & Co. on this trip as guarantee engineers. The Mamo arrived safely in Honolulu with the two barges on April 8. Her running time for the 2100 nautical miles was 10 days, 15 hours, 10 minutes, or an average speed of a little over 8 knots. During this run both main engines operated continuously without incident.

Stern view of the Mamo on dry-dock showing the clean run of the counter, large rudder, and solid bronze propellers.

British Columbia Shipping Holidays

The Shipping Federation of British Columbia Ltd., with headquarters at Vancouver, has recently issued a booklet of rules for "Working Conditions and Wage Schedule," effective January 1, 1931, at British Columbia ports. The principal item of information interesting to the American ship operators is the list of nine stated holidays. These, with their calendar dates, are:

(1) New Year's Day
(2) Good Friday
(3) Empire Day—24th of May
(4) King's Birthday—3rd of June
(5) Dominion Day—1st of July
(6) Labor Day—First Monday in September
(7) Thanksgiving Day—Monday in week during which 11th day of November shall occur.
(8) Christmas Day—25th of December
(9) Picnic Day—To be an agreed date in the month of July, with two weeks' notice to be given.

Note: When any of the above holidays fall on Sunday, the holiday shall be observed on the following day.

Reporting Marine Accidents

Timely Suggestions on the Investigation and Classification of Avoidable Accidents

By Byron O. Pickard

Safety Engineer in Charge, Accident Prevention Department of Pacific Shipowners

INJURIES to industrial workers are of two kinds; namely, those injuries that are intentionally brought about by workers and those that result from what are commonly and thoughtlessly termed "Accidents."

Intentional injuries are of infrequent occurrence, representing only a fraction of 1 per cent. of the total number of industrial injuries reported.

Injuries resulting from so-called "accidents" are common; in fact are so common that the term accident and injury have become almost synonymous; but it has been discovered that it takes ten or more occurrences of an accident to cause an injury to an employee; in other words an injury represents ten or more occurrences of the same accident.

Are we consistent then when we use the term "Accident?" Certainly anything that occurs ten times should not be unforeseen, if we permit ourselves to be considered thoughtful and successful executives.

Is it not more consistent with modern business methods to consider as a mistake or error any controllable occurrence that damages or wastes property, equipment, material, time, and human bodies?

It follows then that an avoidable "accident" is a common mistake brought about through uncorrected and tolerated conditions and practices. A manager may not realize that he is having "accidents" from any particular cause until an injury occurs; but if he neglects to take steps to definitely determine the cause of the mistake which resulted in an injury and to apply the remedy, he is overlooking an opportunity to build up or maintain an efficient organization.

The common mistakes resulting in injuries to personnel, hereafter termed "accidents," are caused by exposing workmen to what is known as a "hazard." The term "hazard" has many applications which may probably vary according to one's imagination, but as the term is used by safety engineers it indicates any condition and/or practice which results in falls of persons, in falling objects, in uncontrolled or unguarded moving objects, flying objects, and the like. In many instances the "hazard" can be controlled. In some instances the exposure to the "hazard" can be limited by providing such safeguards as proper lighting, proper ventilation, proper clothing, mechanical guards, and correcting the habits of the workmen.

Responsibility for Accidents

In a well organized, efficient organization the chief executive assigns certain operating responsibilities to staff members, who in turn trust others to carry on efficiently, after working conditions and practices have been standardized. It is fair then to conclude that when an avoidable accident occurs in such an organization, the manager has the right to assume that some staff member or employee has failed. In other words, he considers that unprevented accidents are mistakes, or failures, and that some one must be definitely responsible for the mistakes. That is, responsible for failing to prevent their occurrence, or let us say recurrence as all man-made accidents are the result of repeated mistakes—mistakes that are occurring over and over again.

We have, then, in considering the responsibility phase, accidents due to:

1. Failure of supervision.
2. Failure of injured employee.
3. Failure of a third party.
4. Unavoidable accidents (Acts of God).

Under **Failure of Supervision** we have:

- a Improper selection of employee.
- b Unsafe working conditions.
- c Unsafe practices.
- d Unsafe machinery, equipment, and tools.
- e Improper or lack of foremen or other bosses.
- f Toleration of known hazards.
- g Lack of discipline.
- h Lack of safety rules.
- i Lack of safety instruction or education of employee.

Under **Failure of Injured Employee**, providing it is the employee's first offense (if he is permitted to do it a second time it should be charged to failure of supervision) we have:

- a Disobedience.
- b Inattention.
- c Intemperance.
- d Clothing.
- e Intentionally subjecting fellow employee to hazard.
- f Repeater or malinger.

By **Failure of a Third Party** is meant some outside organization other than the employer or employee such as a commercial vehicle.

Under the **Unavoidable Accidents** there can be listed only 2 per cent. of those resulting in injuries, and these are due to wind, rain, heat, cold, ice, storms, suicide, or murder, insect bites, and the like.

In determining responsibility for the lack of prevention in the past and for the future prevention of accidents definite consideration should be given as to whether or not positive orders for prevention of accidents have been issued by the chief executive and as to the policy of the company in the past. What interest has the company in the injured man and what contacts are made with him before he returns to work? Is he visited only by the claim agent, by a representative of the insurance company, the attorney, or is he visited by someone from the operating staff who has a definite human interest?

Reporting

The question naturally arises, why should injuries be reported, and if they are reported why does the management interest itself only in the extent of the injury, rather than in what caused the chain of circumstances which resulted in the injury? In many companies only those "accidents" that have resulted in injuries come to the attention of the manager. They hear nothing of the many other mistakes or failures that are costing them money.

Until the several states and the federal government passed laws requiring the employer to compensate the injured employee for injuries received, few injuries were reported. However, the law now requires certain forms to be filled out when an employee is injured. Unfortunately, however, the law does not go far enough, as it does not require or, save in a few instances, does it follow up or penalize for lack of information. This leads to incomplete and inaccurate reporting, with excuses for, rather than causes of, accidents being furnished. No foreman or superintendent wants the state or federal government, or even his employer, to know that he has failed in providing safe working conditions, practices, or habits for workmen. Managers are inclined to accept these excuses and thereby unintentionally tolerate the costly and inefficient conditions which are resulting in accidents. When managers realize that injury reports are indicators of waste, they will require complete reports on each and every injury that occurs in their operations.

The report should include not only a complete description of the cause of the accident which resulted in injury, but also the responsibility phase; that is, Failure of Supervision, Failure of Injured Employee, Failure of a Third Party, or Unavoidable, as described previously, and why the accident was not prevented.

In considering why accidents were not prevented the following major questions are recommended:

1. Was the accident nonpreventable, nonoccupational, or was a third party at fault?
2. Was it due to mechanical failure?
3. Was it due to unguarded openings or unguarded machines?
4. Was it due to working conditions established and tolerated by the company?
5. Was it due to unsafe practices tolerated by the management?
6. Was it due to tolerated workmen's unsafe habits?
7. Was it due to the violation of printed safety rules not included in any of the foregoing questions?

To arrive at complete reports each and every accident will have to be investigated.

It is my belief that (1) all accidents not causing personal injury should be investigated and reported to the management by the foreman in charge of the operation; (2) all non-lost-time injuries with any medical or other expense should be investigated and completely reported in writing by the boss immediately responsible for the injured man; (3) all lost-time injuries of less than seven days should be investigated and completely reported upon jointly by the foreman and the immediate boss; (4) all injuries causing a loss of time of more than seven days should be considered as serious and should be investigated and completely reported upon by a board of inquiry, which will be described later; (5) all permanent partial disabilities, all permanent total disabilities and all fatalities should be investigated jointly by a special board of inquiry and the company's executive safety committee, which will also be described later.

Investigation

The reason for investigating accidents are primarily to interest the executives, the staff, and the personnel in accident frequency, causations, and methods of prevention, and to secure accurate intelligent reports rather than excuses. The investigation will determine the true cause (the physical and human hazards), why it was not prevented (the contributary causes), the lessons learned (how to avoid recurrence), the true cost of the accident, and to whom to assign responsibility for future prevention. It will discover and emphasize the hazard and the unnecessary exposure to uncontrollable hazards; also it will develop prevention through organization, through safe practices, through safe working places, and through safety education. It is true that to properly investigate an accident will require time and expense. In other words, it will add to the cost of the accident, but if it will lead to prevention of recurrence there should be no objection on the management's part to providing time and funds for thorough investigations.

The investigation should be started immediately after the accident has occurred, while the details are fresh in everyone's mind and the conditions are unchanged. All serious accidents should be investigated and completely reported upon by a special board of inquiry; and all permanent disabilities and fatalities should be investigated jointly by a special board of inquiry and the company's executive safety committee. The latter should consist of not less than three men, preferably the general manager, the superintendent of operations, and such company staff man as handles claims or insurance details or deals with the injured man. The personnel of the special board of inquiry that should be appointed to investigate each accident should consist of the superintendent of operations, the foreman having the accident, and the safety engineer or inspector.

Board of Inquiry

The title given to the investigating committee, namely, Board of Inquiry, is selected intentionally, as it is presumed that the said board shall be empowered simply to get at the facts with recommendatory responsibility only and without executive or judicial powers. The term "inquiry" has a psychological value in that it will not give the witnesses ideas that they are being examined by state or federal officials, lawyers, or claims agents. The superintendent of operations should be the chairman. The Safety Engineer should, with the approval of the chairman, act as the interrogator in carrying on the investigation. It is advisable for the board to begin with the injury and carry its investigation back step by step until it comes to the real hazard, and the tolerated or uncontrolled exposure to the hazard. The procedure will include:

a. A study of the physical conditions; gear, equipment, tools; common practices; habits; safety rules; organization; etc.
b. A formal hearing or board meeting.
c. Conference with the first-aid man, the doctor, claims agent, and others.
d. Preparation of the report.

The Board of Inquiry, accompanied by the immediate boss having the accident, should first visit the place of the accident and study the physical conditions above outlined. If there is a possibility of third party responsibility it would be well to include in the personnel visiting the place of the accident some responsible representative of the third party in order to get his version of the accident.

After all the physical conditions have been determined the board should retire to some quiet room. The

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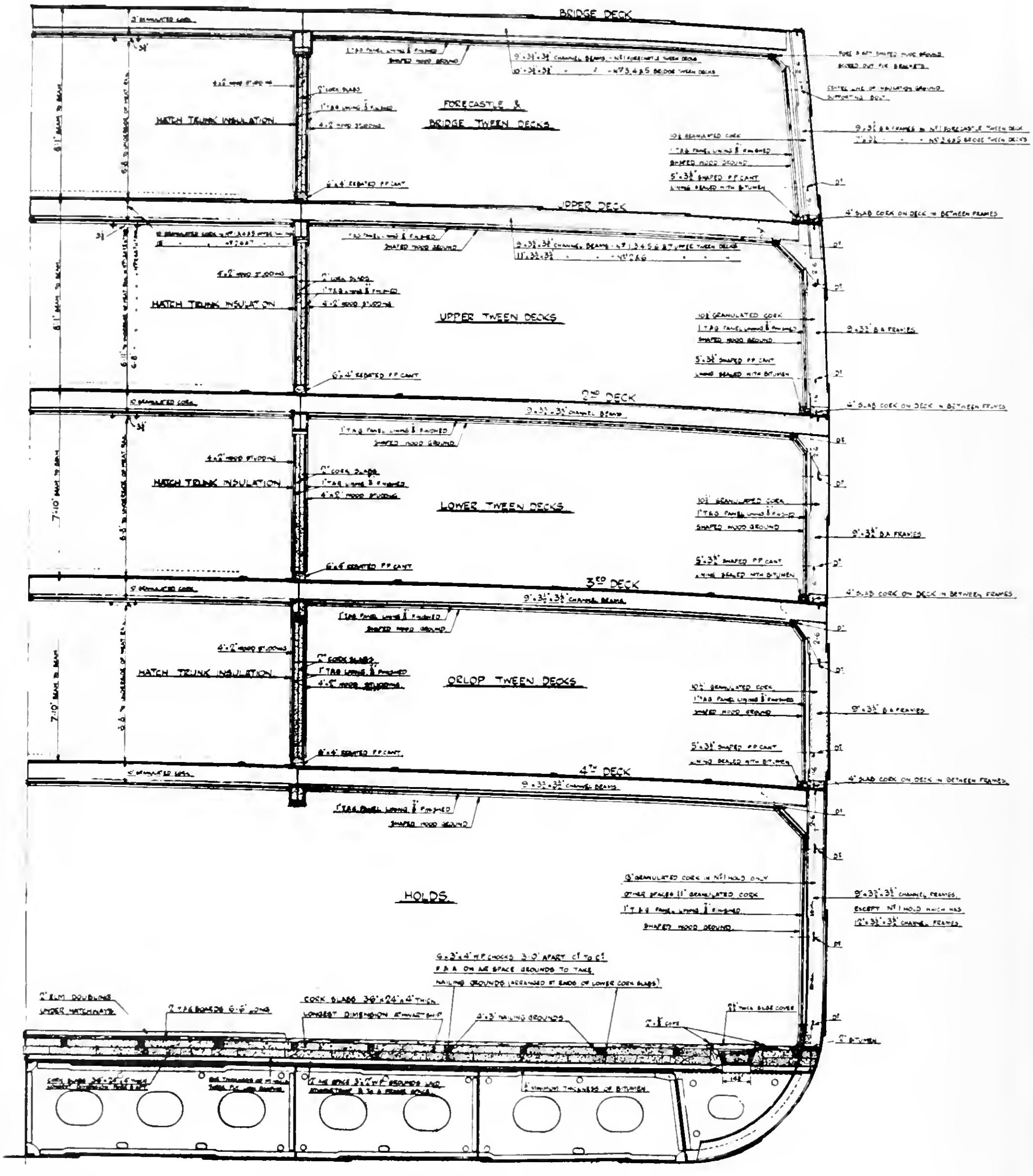
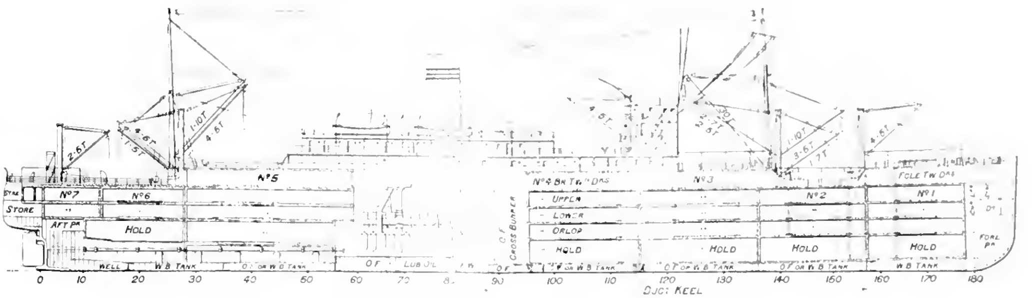
Cork Applications on Motorship Tuscan Star



Half midship section of world's largest refrigerated cargo carrier.



Inboard profile of Blue Star refrigerated motorship Tuscan Star.

The Largest Insulation Job Afloat

THE Blue Star Line motorship Tuscan Star, finished about one year ago by Palmers Shipbuilding and Iron Co., Ltd., of Hebburn-on-Tyne, England, has the largest insulated hold capacity of any ship afloat. She is 470 feet long, between perpendiculars, 68 feet molded beam, and has a gross measurement of 11,450 tons. She is powered with two single-acting Sulzer diesel engines. This plant gave the Tuscan Star a trial speed of well over 16 knots. Auxiliary power is provided by four 4-cycle, 5-cylinder, 500-brake horsepower Sulzer diesel engines, each direct-connected to a 340-kilowatt, 220-volt, direct-current, General-Electric generator.

This vessel has seven insulated cargo holds and four continuous decks, as shown in the inboard profile herewith. These holds are divided by decks and bulkheads into 65 insulated cargo spaces with an aggregate capacity measured inside the insulation of 595,000 cubic feet. The ship's provisions rooms add 2800 cubic feet to this, making a grand total of 597,800 cubic feet. These refrigerated spaces are equipped so that any of them may be used to carry at the proper temperature and air condition either chilled meat, frozen meat, or various fruits.

J. and E. Hall, Ltd. of Dartford, England, supplied the refrigerating machinery which is located on the bridge deck and works on the carbon dioxide compression system. There are three independent compressors of the vertical, enclosed, single-acting type, each having four compressor cylinders, and each driven by a 145-brake horsepower, 220-volt, direct-current, variable-speed motor. Normal speed at rated capacity is 280 revolutions per minute. This can be increased to 375 revolutions per minute by shunt regulation or decreased to 100 revolutions by use of a special motor generator set which functions as a negative booster, and, by means of a special switchboard, can be inserted into the circuit of any one of the three compressor motors without shutting down the compressor. Any two of these compressors is capable of maintaining an even temperature not exceeding 15 degrees Fahrenheit throughout all of the refrigerated spaces on the ship.

The insulation is installed on the standardized Panel System, which has been for six years the specified method on all refrigerated carriers for the Blue Star Line. This system consists of smooth, white panels of tongue and groove lining secured to the frames of the ship and holding in place granulated cork or other loose insulating material such as silicate cotton.

A standard line of fittings and fastenings has been developed for this system, so that it is applicable to any part of a modern steel vessel. Any panel can be dismantled at any time for the examination of piping or of the ship's structure. It is the work of only a few minutes to remove a cleat at one side of the panel and lift out the tongue and groove boards. After examination has been complete and repairs, if any, effected, the panel is replaced, board by board, the cork is shoveled or poured into the recess and the insulation is as good as ever.

It is claimed that this system is the most economical in specific installation, maintenance, and repair costs of any yet devised for minimizing refrigeration leakage aboard ship. The information on which this article is based and the illustrations reproduced herewith were furnished through the courtesy of the Cork Insulation Company, Inc.

Cory Model Presentation

A WORKING model of a mechanical steering order telegraph as used on ships of the late nineteenth century has become part of the historical marine collection of the Smithsonian Institution at Washington. The model, built in 1866, was recently presented by the Chas. Cory Corporation, marine equipment producers for ninety years, to Ernest Lee Jahncke, assistant secretary of the navy, who turned it over to the museum.

The model, made of wood and brass and operating identically as the original telegraphs, is contained in a glass case eight by twelve inches in size. It was found several months ago in an out-of-the-way corner of the Cory plant in New York after the Bendix Aviation Corporation had acquired Cory as one of its divisions. Presentation of the model to the Navy was arranged by George K. Perkins, Washington manager for Cory, and A. P. Homer, general manager for the same corporation.

Reporting Marine Accidents

(Continued from Page 189)

superintendent should read the accident report that has been sent in by the foreman or boss, and then ask the safety engineer to question those men who have been requested to furnish information. The men to be interrogated should include the injured man, his immediate boss, the foreman having the accident, the first-aid attendant, the time-keeper, all witnesses of the accident, the equipment repair man, and such others as the board may decide to interview. Each man should be questioned privately; that is, each should be alone with the Board of Inquiry. It would not be fair to question the injured man in the presence of his boss, nor the boss in the presence of the injured man. It will be noted that the foreman having the accident is included in the personnel of the board. This is intentional, as it is taken for granted that he is sufficiently broadminded to arrive at unprejudiced conclusions, and after all one of the principal reasons for the investigation is to interest foremen and superintendents in accident prevention.

The safety engineer should carry on his examination in a careful, quiet, patient, and sympathetic manner. He should explain to each witness that any information received is confidential to the company and that the only purpose of the investigation is to devise ways and means to prevent recurrence; that, so far as this board is concerned, the responsibility for not preventing the accident is determined only to serve as an example; that no one will be censored or disciplined for furnishing information; and that no facts disclosed will be furnished lawyers, courts, state, or federal commissions, insurance carriers, or any other public agencies. No written record will be made of any information given by any man; that is, when the written report is given to the company it will consist of conclusions and recommendations only. In other words, the study of the accident is made to prevent future accidents rather than to determine the effect of past ones. The men being questioned should not be sworn in, but should be asked to give all their information freely and truthfully for the good of the cause.

If the injured man is able to appear before the board he should be the first one examined; if unable to attend he should be examined at the earliest possible date.

It is suggested that the Safety Engineer of each company be required by his manager to prepare and submit for the management's approval a tentative list of questions which are to be asked the injured man, the immediate boss, the foreman, and such other employees as may be called before the Board. These questions, if prepared in advance, will include the gradual or step by step development of the responsibility for nonprevention; why the accident was not prevented; the hazard; the unnecessary exposure; suggested methods of preventing recurrence; and many other conditions which should be of inestimable value to the management. My department has such a questionnaire developed consisting of more than 300 questions.

At the conclusion of the examination by the safety engineer, he should turn the meeting over to the chairman for discussion. The board will then carefully consider all of the things that they have heard from the several witnesses. The discussion, however, should be limited to the determination of those things which I have heretofore set forth. After the Board has arrived at its conclusions, the safety engineer will, no doubt, have to prepare the report. After it has been prepared it should be signed by the superintendent, foreman, and safety engineer, and two or more copies turned over to the management. The nature of the report should be along the lines previously discussed; no mention should be made of any individual's testimony. The report should be brief and limited to the conclusions arrived at by the board, but should, of course, contain a complete description of the conditions which brought about the accident and recommendations for the prevention of recurrences.

Conclusion

It is urged upon each industrial concern to look upon every accident as a wasteful, inefficient occurrence which cannot be afforded in these days of intense competition—to believe injuries are avoidable—that time taken out and expense contracted to investigate injuries will pay dividends—and to insist that no one is too busy to make prevention of costly accidents a part of his routine.

National Foreign Trade Convention

SIGNS are apparent of a steady though gradual improvement in world trade, declares James A. Farell, chairman of the National Foreign Trade Council, in issuing the call for the Eighteenth National Foreign Trade Convention, to meet in New York City on the 27th, 28th, and 29th of this month.

World exports for 1930, as estimated by the Council, amounted to about $27,000,000,000, almost six and a half billion dollars less than the export trade of 1929. In actual volume of export trade, however, figures now available show that, accounting for reduction in prices, the world in 1930 carried on 90 per cent. of the export trade of 1929 and almost a billion dollars more in exports than before the war.

In urging American foreign traders to consider very carefully the problems of the present year, Mr. Farrell says:

"There are indications that the world wide depression in business, with which we have been dealing for several months, is subsiding and that the upturn is beginning. Our commerce confronts a situation which merits the consideration of all concerned in foreign trade. It is a time for thorough examination of economic conditions and for practical demonstration of that spirit and habit of cooperation that so signally marks American foreign trade practice."

Among the speakers who will address the New York meeting are Victor M. Cutter, president, United Fruit Company, Boston, on "Our Relations with Latin America;" Wallace R. Farrington, publisher of the Honolulu Star-Bulletin and ex-Governor of Hawaii, on "The Pacific Area;" Dr. Max Winkler, vice-president, Bertron, Griscom & Co., on "Underlying Economic Conditions Affecting Credits;" James A. Farrell, president, United States Steel Corporation, on "The World Trade Outlook;" and several distinguished guests from Latin America and Europe.

American Ships for American Goods

By H. Gerrish Smith

President, National Council of American Shipbuilders

ONE of our greatest Americans has said that the greatest subsidy our ships could have in the overseas trade would be support by the American people, and that the greatest hardship under which they are now laboring is the lack of such support. This does not, of course, mean that American exports should be confined entirely to American vessels. Such a proposition is impracticable, as shipping is an international problem, and what we export constitutes the imports of other nations, and what we import is their exports. It does mean, however, that Americans should always have a favorable spirit toward the use of their own vessels in the transportation of our goods to foreign markets. Other nations have developed this spirit to a high degree, and much of their success in shipping has been due to this fact.

Let us consider briefly foreign trade and the relation of shipping to it. Taking the trade of the world as a whole, imports naturally equal the exports. In speaking of our foreign trade we are apt to dwell upon our exports rather than our imports, as they constitute what we sell. We must not overlook the fact, however that foreign nations cannot buy from us without the purchasing power which is acquired, in turn, by the goods they sell which are their exports, but our imports. About 10 per cent. of the entire business of the United States in the year 1929 was devoted to the production and shipment of goods to foreign markets, to the use of imported goods in our industries, and for the every needs of living. About 16 per cent. of the entire foreign trade of the world in and out is United States trade, most of which is water borne. About 40 per cent. of the foreign trade of the United States passes through the port of Greater New York.

Our export trade is with all nations, and it has grown enormously since the war. It is true that it has been seriously depressed during 1930 and up to date this year, but the trend from 1922 to 1929 is indicative of the natural growth of our foreign trade, which seems to be normally at the rate of over four per cent. a year. Because of the facilities for securing information as to foreign markets that have been developed by the Department of Commerce through its trade representatives, by the Department of State through its Consular Service, and by private agencies that are furnishing similar information, and through the impetus and protection that has been given to our foreign trade by a re-establishment by the Shipping Board since the World War of American vessels in this trade, hundreds of the smaller industries of the United States are now selling their products abroad where they never thought of seeking markets before the war, all of which emphasizes the importance of establishing and maintaining uninterrupted channels of communication between the ports of the United States and the ports of the world with which we conduct our trade.

There are obviously two ways of doing this; first, do it ourselves; second, hire someone else to do it for us, and this brings us back to the old adage, "If you want something done well, you must do it yourself." All important maritime nations have appreciated the necessity of owning and operating their own ships in establishing and developing their foreign markets, and each jealously watches the markets of the other, and all records show that where a nation has established its own ships in the trade routes of the world its trade has grown, and this statement includes the United States, whose foreign trade has grown so enormously since the World War when we have had a substantial part of it carried in American ships. The sympathetic interest in trade and the control over shipments and freight rates can be best sustained by having a substantial portion of our goods in foreign trade carried in American vessels.

American ships are at a distinct handicap, however, in foreign trade. They are private enterprises engaged in competition with all the other vessels of the world. American ships cost from 50 to 60 per cent. more to build than British vessels, and the pay of officers and crews of American ships and their subsistence is also higher; so that the American ship operator in foreign trade is confronted with an operating differential against him which cannot be eliminated. Because of the national character of shipping, however, and the benefit it gives to our industries in the transport of our goods abroad and the uninterrupted maintenance of our foreign markets it is important to the nation that we should have our own shipping in the foreign trade, and it is for this reason that Congress has granted aid to overcome this cost differential by the Merchant Marine Act of 1928. If we are to have an American merchant marine, it is incumbent upon the people to do all they can to help shipping before aid is asked from Congress. The greatest help that can be given to the American ship operator is the patronage of his ships by American shippers. Our American people are said not to understand the importance of American ships to their prosperity; that is, they are not sufficiently "ship minded;" and this is undoubtedly true.

Our country is so great and its interests are so many that those who seek foreign markets do not appreciate why it is to their advantage to patronize American ships in transporting their goods to these markets. In this connection, we must understand the difference in the possible control over the shipment of exports as distinguished from imports. The greatest opportunity to patronize our own ships is in imports, because when we buy our goods abroad we can specify how they are to be shipped. That is exactly what is done by the foreigner when he buys from us, and it is the reason a larger percentage of our exports than of our imports are carried in foreign vessels. Shipping c.i.f., which means cost, insurance, and freight included in the price, permits the buyer to control the shipment and to patronize the vessels of his own nationals if he wishes to do so.

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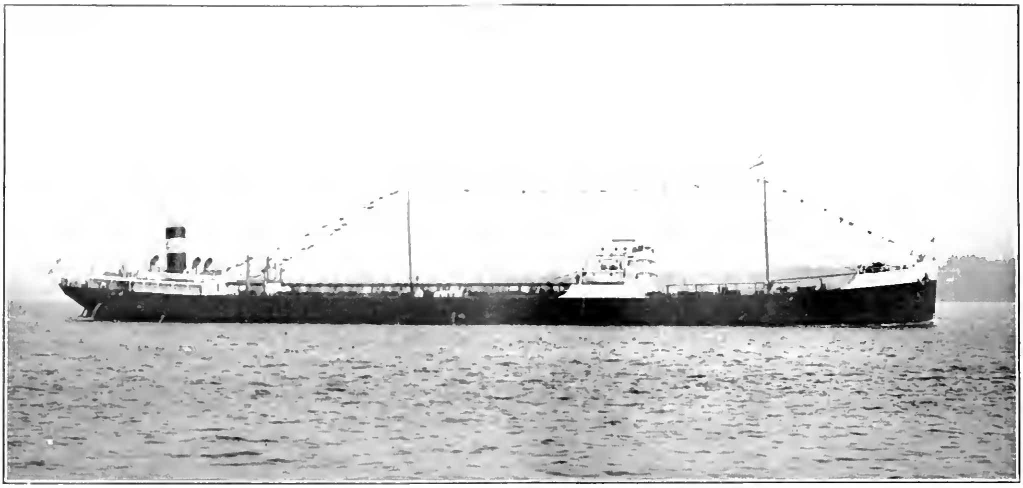


Standard Shipping Company's tanker G. Harrison Smith.

The Marine Steam Turbine

STEADY, persevering research and practical experiment both in Europe and in America are producing wonderful progress in the technique and the economics of steam prime movers, both afloat and ashore. A recent paper on "Trends in Steam Turbine Development" read by A. G. Christie, Professor of Mechanical Engineering, The Johns Hopkins University, before the Fourth National Meeting of the Fuels Division of the American Society of Mechanical Engineers, lists these trends as:

(a) Use of higher pressures and temperatures.
(b) Increase of capacities and output from single casing.
(c) Use of better materials, particularly blading.
(d) Betterment of efficiency over wide range of load.
(e) Closer adjustment to requirements of service.
(f) Development of turbines for binary fluids

For marine purposes, particularly in the main propulsion units, the designer and the operator is at present interested principally in items (a) and (c).

Higher Temperatures and Pressures

The possibilities in steam pressures up to the critical point of 3200 pounds per square inch have been thoroughly investigated and the gains to be expected are well known. The effects of higher steam temperatures, however, present a more difficult problem. Metals formerly used in steam turbine construction develop undesirable tendencies above 750 degrees Fahrenheit. Tensile strength and fatigue and tendency to "creep" increase rapidly at higher temperatures. Materials now available commercially enable designers to guarantee safe working at steam temperatures up to 900 degrees Fahrenheit. A number of American central stations ashore now use 1200 to 1400 pounds per square inch at 750 degrees Fahrenheit. Using steam at 900 degrees Fahrenheit temperature may make it economical to raise the pressure to the 2000-2500 pound range.

Improved Materials

Manufacture of shafts and turbine disks has been steadily improving through the use of:—Better steel —foundry and forge practice; internal inspection by bore holes; vibrating the disks before assembly; and careful static and dynamic balancing of the rotor after assembly.

Blade troubles require much study and research to determine the best:—Location of lashing wires; method of silver soldering these wires; form of shroud; and form, size, and angle of blade for the larger sizes of turbines.

At present the materials most suitable for blading are properly heat-treated, stainless steel (12 per cent. chromium and 0.1 per cent. carbon recommended) and some nickel alloys.

For high temperature work, a suggestion has been made to use hollow stationary blades or hollow diaphragm partitions in which a hot medium can be circulated and this heat be used to dry the low pressure steam passing through, thus decreasing blade erosion and increasing thermal efficiency.

Oxidation of blades has been largely overcome by careful deaeration of feed water. Deposits on turbine blading which causes much trouble in some central stations may be largely eliminated by purer make-up feed, tighter condensers, and drier steam from boiler drum to superheater.

Marine Geared Turbines

In a paper read before the 1930 meeting of The Society of Naval Architects and Marine Engineers, and fully abstracted in the February, 1931, issue of Pacific Marine Review, C. R. Waller, chief engineer of the De Laval Steam Turbine Company, presented basic data and specifications for a line of standard geared turbines to cover a range of 3500 to 15,000 brake horsepower capacity at 400 pounds per square inch boiler pressure and 700 degrees Fahrenheit t[illegible]. Commenting on this paper, W. W. Smith, chi[illegible]r of the Federal Shipbuilding & Dry Dock [illegible], declares it to be one of the most importan[illegible]tions to the literature of this subject. It is [illegible]d by an outstanding authority, contains a large [illegible]nt of specific and detailed information and shoul[illegible]e as a ready reference for the preparation of [illegible]ns and specifications. Standardization is most important in marine turbine development in order to realize both high efficiency and low first cost. The standard units proposed in Waller's paper are suitable for practically all merchant vessels within the given power range.

W. W. Smith believes that the nozzle area of the astern turbine should always be sufficient to pass 20 to 25 per cent. more steam than the normal flow so that, when required, the astern turbine will deliver full torque at half revolutions. He sees no reason to limit the steam temperature to 700 degrees, but prefers to use for this line of standard turbines the same conditions as maintained on the G. Harrison Smith and the W. S. Farish, two new Standard Shipping Company tankers recently delivered by the Federal Shipbuilding and Dry Dock Company and engined with DeLaval geared turbine units taking steam from Babcock & Wilcox water-tube boilers. These conditions are: At superheater outlet, pressure 400 pounds, temperature 750 degrees Fahrenheit; at turbine inlet, pressure 375 pounds, temperature 725 degrees Fahrenheit.

"These pressures and temperatures," declares Mr. Smith, "are not the present limits. We are now investigating a new standard line which will have 900 pounds pressure, and 900 degrees Fahrenheit temperature at the superheater outlet. For these and the preceding conditions, the estimated performances of a twin-screw passenger ship of 20,000 shaft horsepower, with attached generators and electrical auxiliaries, are as follows:

Standard Line	A	B
Superheater outlet. Pressure, pounds	400	900
Superheater outlet. Temperature, deg. F.	750	900
Turbine inlet. Pressure, pounds	375	875
Turbine inlet. Temperature, deg. F.	725	875
Turbine outlet. Vacuum, inches	28.5	28.5
Ideal water rate. Lbs. per S.H.P. (a)	5.45	4.615
Fuel rate for all purposes. Lbs. per S.H.P. (a) (b)	.58	.49

(a) Based on power delivered to propeller shaft.

(b) Based on 19,000 B.T.U. oil.

"Thus, for line A, the fuel rate for all purposes is 0.58 as compared with 0.49 for line B; the former being 18 per cent. more than the latter.

"For line B, the conditions given, and a fuel rate for all purposes of less than ½ pound per shaft horsepower are possible at present. How much further than this it may be possible to go is not known; but, in general, the prospects of further progress in steam machinery are excellent.

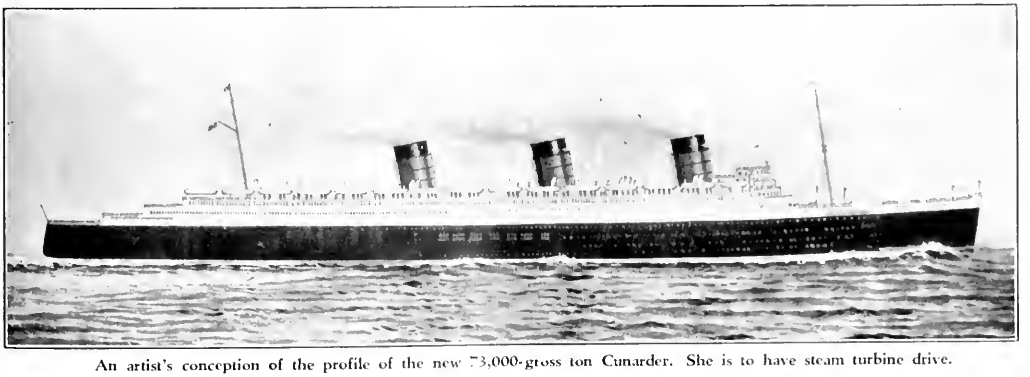
"Many have the idea that high efficiency installations are high in cost, which is not true. Due to the great reduction in steam consumption, the boilers, condensers, auxiliaries, and other parts are much smaller. In consequence, the first cost is less than that of an old style installation, in addition to the great reduction in fuel consumption and operating cost. Thus, we have the very rare case in financial economies where a smaller investment produces a great reduction in operating cost, resulting in a highly advantageous return on the investment.

"An important feature on the G. Harrison Smith was the use of an attached generator with electric auxiliaries. With this arrangement, power for the auxiliaries and other purposes is supplied at the high efficiency of the main turbine. Without this feature a fuel rate of 0.6 pound per shaft horsepower for all purposes could not be attained in such an installation of 4000 shaft horsepower.

"There is no reason to hamper geared turbine development by restricting the pitch line speed. In fact, properly designed and built gears with high pitch line speeds seem to run better and more quietly than those with low speeds. This is true only of highly accurate gears; and none other should be considered or used. Accurately cut gears and moderate tooth pressures insure quiet running and long life. In the final analysis, they are the most economical.

"Modern developments in high pressure steam are being much discussed. It may be surprising to know how very old these supposedly new developments really are. Practically all of the new ideas and features which are being used in our so-called modern installations were pioneered by De Laval in Sweden 30 to 40 years ago.

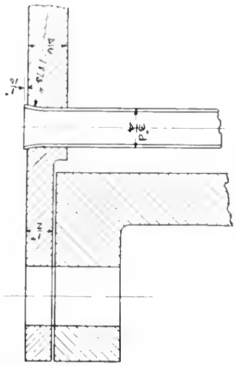
"Modern high efficiency geared turbines offer to the shipowner unusual possibilities of reducing cost and increasing earnings. If he will take advantage of these possibilities and make progress, he will be liberally rewarded. And, there are excellent prospects for still further progress, and for still greater reward in the future. This is, indeed, a gratifying outlook."



An artist's conception of the profile of the new 73,000-gross ton Cunarder. She is to have steam turbine drive.

A Condenser Tube Experiment

DURING the past year the United States Shipping Board, Bureau of Construction, Engineering Development Department has been carrying out a very interesting experiment with condenser tubes rolled at both ends.



Sketch showing Shipping Board method of rolling tubes into tube sheet.

For some time this department has been studying the matter of condenser troubles due to packing and splitting of tubes and other causes. It was well known that the condenser tubes expanded into the sheet at one end and packed at the other had been used extensively with good results. Also tubes expanded into the tube sheet at both ends provided with means for expansion, such as bowing of tubes, had been tried both afloat and ashore with good results. It has been the opinion for some time of several prominent marine designers that there would be very little trouble, if any, from the use in marine condensers of straight tubes expanded into the tube sheet at both ends. These designers considered that the elasticity of the metal was ample to accommodate the amount of expansion involved.

Early in 1930 the Shipping Board decided to make an experiment of this method so that information would be available to the American merchant marine based on actual sea trials. The necessary funds were therefore appropriated and the steamship Bakersfield was selected for the trial installation.

This selection was made because the steamship Bakersfield is operated in the trade between New York and South American ports with a long round voyage covering many stops and great differences in temperature of sea water, and also because the propelling machinery consists of Scotch boilers and reciprocating engines. The Scotch boiler, of course, would be less harmed than the water-tube boiler in case of failure of the condenser tubes and salting of the boilers; and the reciprocating engine provided a more severe test of this method since, on account of operating at a comparatively low vacuum, there would be a higher temperature difference between the sheet and the tubes.

The condenser on the steamship Bakersfield is of the 2-pass type, with 3500 square feet of cooling surface in $^3/_4$-inch diameter tubes. The shell is of cast iron, with circulating water entering at the bottom and discharging at the top. The original tube layout was retained. The tubes and the tube sheets were replaced with new tube sheets of Muntz metal and with tubes of Admiralty metal (Shipping Board specifications). The tube sheet was decreased in thickness from one inch to $^3/_4$ inch and was faced down to $^1/_2$-inch thickness in the way of the flange. The rolled joint was made as in the illustration herewith.

This work was completed during March, 1930 at Philadelphia; and on completion the vessel immediately proceeded on her voyage of 13,625 miles, making in all 14 points of call and being away on this first voyage for 56 days. The engineer in charge was provided with accurate apparatus for testing water, and kept a log on the salinity. The water showed no increase whatever in salinity until approaching Jacksonville homeward bound, when it suddenly began rising and reached a maximum of 15 grains. An inspection at Jacksonville showed that two tubes were split. These were plugged and immediately the salinity decreased. No joint failures were found and no rerolling of tubes was necessary.

The log for this voyage shows that an average of 24.3 inches vacuum was maintained, the average sea temperature being 76 degrees and the average discharge temperature 102 degrees.

The foregoing information is taken from an article by James S. Malsteed, published in the Journal of the American Society of Naval Engineers for November, 1930. Later information to the Shipping Board is contained in a letter dated January 23, 1931, from the operators of the vessel, as follows:

"With reference to your letter of January 26, 1931, please be advised that the Chief Engineer reports no unusual conditions existing from the operation of the main condenser; the chlorine content of the condensate being normal at all times. The only difficulty experienced with this apparatus was the splitting and/or breaking of two tubes on the first voyage. These tubes have not been removed from the condenser due to the necessity of removing the main heads to accomplish this work."

It would seem that the results so far obtained in this experiment indicate that this is a practical method of getting rid of many of the troubles incident to the use of condensers at sea.

American Ship Cargoes

(Continued from Page 193)

Of course the American ship operator must give service to expect patronage. We now have well established trade routes with safe, regular service to most of the ports of the world; and our goods can be delivered by American vessels not only in good condition but in reasonable time; so that patronage of our own ships is justified.

I am of the opinion that the most serviceable act that could be performed to foster the patronage of American ships by American shippers would be a carefnl and thorough research to ascertain what goods we ship in American vessels and those that are not so shipped, and if not, why not. Such a research will develop constructive information on which a definite program for a better patronage of American ships can be brought about.

From the standpoint of shipping and its future, I believe the best thing that could be done to make the American people more ship minded would be the establishment and maintenance of a strong transatlantic line of ships equal to or greater in speed, comfort, and safety than those of other nations. Such ships would be known and talked about by every American as they would be prize winners and would furnish the advertisement, which is the forerunner of success in any line of business.

(Abstract of an address before the New York Junior Board of Trade, March 24, 1931.)

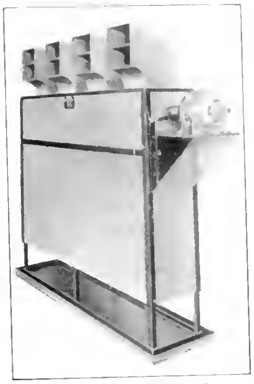
Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part VI.—Ventilation and Air Movement

By L. L. Westling

THE application of refrigeration to an insulated space and its contents is more than the circulation of brine or a refrigerant through coils. Means must be provided which will transfer the heat of the cargo to these coils. Obviously this requires a movement of the air of the room through the cargo and along the coils in successive cycles. Until quite recently this link in the chain has not had the attention of the builders or operators that it should have had. In consequence many installations have been made that are inefficient and in some cases very defective.



A Kroy 4-unit air cooler.

The transfer of heat from the cargo to the coils by air movement is accomplished by either one of three well-known methods; namely, (1) by gravity or thermal air movement; (2) by fans located within the space; and (3) by fans external to the space which draw the air from the cargo space through a coil room and thence back to the cargo space.

Each of these systems has applications particularly adaptable in principle. Size of space and conditions of service often dictate their choice.

Gravity Circulation

Gravity circulation is so called because the air movement is dependent upon the change of weight of air due to temperature differences, as indicated in the following table:

Temperature	Wt. of 100 Cu. ft. free dry air
Zero	8.64 lbs.
12°	8.42 lbs.
22°	8.24 lbs.
32°	8.07 lbs.
42°	7.91 lbs.
112°	5.91 lbs.

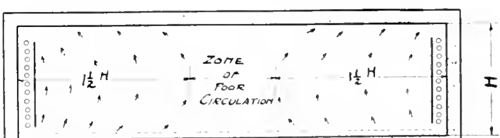
In passing the refrigerating coil the air cools, contracts, or increases in density and settles downward toward the deck. This column of cold, heavy air displaces the column of warmer air in the room, which finds its way back to the coils; and the cycle is repeated. This movement corresponds to, and responds to, laws like those governing drafts in chimneys. The necessary temperature difference required for good velocities is large, and this violates the first rule of perfect refrigeration; namely, uniform temperatures. However, no heat transfer can be effected without air movement; hence the gravity system at its very best is a poor compromise.

This system was once considered satisfactory for all sizes of spaces, for all services, and for all conditions, and some vessels are still employing it. It is now acceptable only in small spaces, such as ships' service boxes.

There is a practical limit to the distances which coils will refrigerate when installed with the gravity system. It has been found to be ineffective at a distance from the coils greater than $1\frac{1}{2}$ times the height of the wall against which the coils stand.

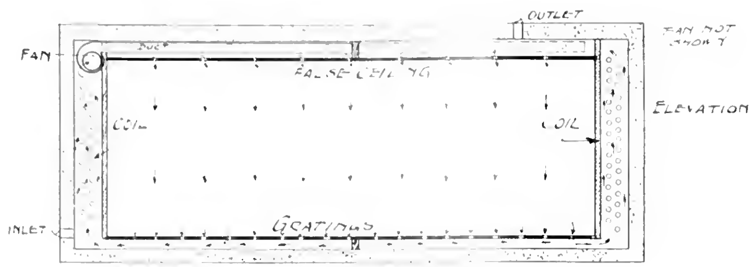
Ceiling Coil Undesirable

Greater distances may be refrigerated with gravity systems by the installation of the very undesirable ceiling coil. Overhead coils are cargo destroyers, particularly in vessels whose rooms are stowed with cargo destined for more than one port of call. The collection of frost on these coils will melt during the period of discharging cargo, and the moisture will drop on the remaining cargo and often will do serious damage. Ceiling coils should never be installed without wooden bunker pans into which the water can drip and be carried off to the deck scuppers, though few steamers have sufficient head room to allow such an installation being made.



A diagrammatic representation of a simple rule that will help in designing refrigeration chambers and the arrangement of coils therein.

There are designers of refrigerator spaces who would ridicule the idea of a perforated smoke stack on the boiler plant, but who would install open battens over refrigerator coils and expect an effective air movement by gravity. The air about the coils should be confined to that space or channel until it reaches near the deck. This is accomplished by replacing the open batten or the wire mesh screen with solid wooden baffles. These baffles not only augment the "chimney" effect but ade-



Diagrammatic sketch showing sectional elevation of a refrigeration chamber fitted for forced ventilation system with short air path.

quately protect the cargo stowed close to the low temperature coils. In sharp freezers the baffles are not so necessary but they will improve the heat transfer by increased velocities.

Care must be exercised in locating coils and baffles or battens to insure air channels when the coils become heavily frosted. Clearances of two inches from wall and baffle has been found to be adequate. Solid baffles are to be recommended for all methods of air movement, for increased plant efficiency; and the construction of these will be treated in future chapters.

Gravity circulation may become very dangerous to cargo with improper stowage. Cargo stowage, as will be treated in following chapters, is often poorly supervised; and cargo improperly placed will effectively block air movement at the base of the coils. Very low temperatures at this zone may result and chill or cooler cargo may become damaged from frosting or freezing. Such impeding of air movement will probably result in warm zones at the top of the same room where thermometers are usually hung; and so bring on faulty control of brine or refrigerant and make injury to the cargo all the more certain.

Forced Air Circulation

Gravity circulation of air could advisedly be displaced in all types, sizes, and services of refrigerators by some system of forced air movement. In small spaces, the function of the usual coil systems can be taken by the unit cooler, which apparatus is low in cost, easily maintained, and economical of space. This unit is similar to the well known unit heater and consists of a cabinet containing coils and fans. The fan forces the air through the coil compartment and out into the space overhead, and the air returns to the fans through openings near the deck. Coils with fins should be avoided where the temperature of the brine or refrigerant is low enough to form frost on the surfaces as frost will quickly fill the fin spaces, reduce the cooling surface, and choke the air passages.

Large spaces would require too many unit coolers to be practical, and other combinations of fans and coils must be used. Methods for accomplishing this are numerous; and opinions vary among designers as to which is the most desirable. Each space requires individual study and treatment. There are, however, four conditions that must be met for satisfactory results.

First, the air movement must be general and uniform throughout the space. Second, the velocity through the cargo must be no greater than that which will produce this uniform condition. Third, the air path through the cargo must be as short as practicable. Fourth, the system should be designed to prevent inpedances by cargo or construction.

A uniform temperature of the air throughout the cargo is equivalent to a uniform application of refrigeration to that cargo. The rapidity with which the heat is removed from the stowage is then alike in all parts of the compartment, and uniformity of condition of cargo is assured upon delivery.

While cycles of air movement through coils and cargo affect a heat transfer, unfortunately each "revolution" successively deposits additional moisture on the coils in the form of frost, and this moisture comes principally from the cargo. Mechanical refrigeration is undeniably a dehydrating or drying process, to the detriment of the cargo carried. In consequence there is a practical limit to the frequency of these cycles of air movement. They should be no more frequent than will produce uniform temperatures, for exceeding this no gain is made in the refrigeration and the drying out of the cargo is augmented. Generally speaking, the velocities and cycles may be reduced as the heat is drawn from the cargo and means of regulating the fan capacities should be provided.

Heat transfer, as has already been shown, requires a temperature difference to produce that flow of heat. Hence, to apply refrigeration, the cargo must be at a higher temperature than the enveloping air. The movement of a large quantity of air with a very small temperature difference and rise is equivalent to a small quantity of air with a large temperature difference and rise. Likewise a long path of air through the cargo must have a greater terminal temperature difference than a short path with the same temperature difference between cargo and its enveloping air along the whole path. That is to say, if there is a temperature rise of the air of one degree per ten feet of air travel the terminal temperature difference of a 10-foot path would be but one degree. Were the path 100 feet with the same rate of rise the terminal difference would be 10 degrees. With a temperature rise of 0.10 degree per foot, which might be had with a greater velocity, the terminal temperature difference would be but one degree in the 100-foot travel. Keeping in mind the drying effect of frequent cycles, it is evident that the velocities should be reduced as the terminal temperatures tend to equalize.

In systems with one-way flow of air, the outlet side of the cargo space will always be at a higher temperature than the inlet side, reducing, of course, as the heat is being removed from the cargo. This effect is minimized by systems in which the direction of the air flow is changed at frequent intervals producing somewhat of a regenerative cycle.

Ship structure, by its very nature, unfortunately produces many irregular surfaces. Beams, girders, webframes, and such members frequently protrude into spaces which are to be insulated for refrigerated cargo stowage. This oftentimes makes it very difficult to obtain uniform operating conditions due to the tendency of the air paths to form eddies or still-air spaces in these recesses or corners. Special treatment of such enclosures is necessary to insure good results.

To produce a general movement of air within the space and yet prevent too frequent cycles of air travel along the coils and through the cargo is a problem to which the writer has given much study. The result has been the development of a system that has proved successful in some very difficult applications.

An electric fan unit of the pressure blower type is located within the space, if possible near a point which would otherwise tend to form a still-air zone. The fan is secured to the deck head and a suction is lead downward along the bulkhead to within 18 inches of the deck. The fan discharges into a duct secured to the ceiling and located in the center of the space. This duct tapers in its length and has perforations on its vertical faces, through which the air is forced. These orifices direct the air horizontally into the space toward the wall coils. A portion of the air is thrown against the bulkhead, carrying with it much of the upper air of the room. It is forced into the coil spaces behind the baffles, thence through cargo and gratings, and back to the suction duct of the fan. A portion of the air from the orifices short-circuits through the cargo to the suction of the fan.

This provides a thorough mixing of all air of the room, resulting in a very uniform temperature condition. The air that passes the coils affects the refrigeration; and the air that by-passes through the cargo provides the mixing. The portion of the air not passing the coils tends to build up in humidity and to reduce its tendency to dry the cargo.

On certain installations of this type serving the Pacific Northwest and Europe, excellent results have been had in carrying apples with low temperature brine and wire mesh coil screens. It is reported that temperature variations in some very irregularly shaped spaces have been not more than one degree, which condition was attained shortly after closing of the cargo doors.

In very small rooms it is suggested that in lieu of the perforated duct a fan-shaped nozzle be fitted to the discharge of the blowers, directing the air back over the cargo.

This system has been effective in all services from sharp freezer to cooler. It is recommended that a small pipe connection be made to the discharge duct leading to the outside so that a small quantity of the internal air is constantly being bled off; and means should be provided for the ingress of new, fresh air. This method of renewing air is preferable to intermittent and larger exchanges which are not conducive to constant conditions of temperature or humidity.

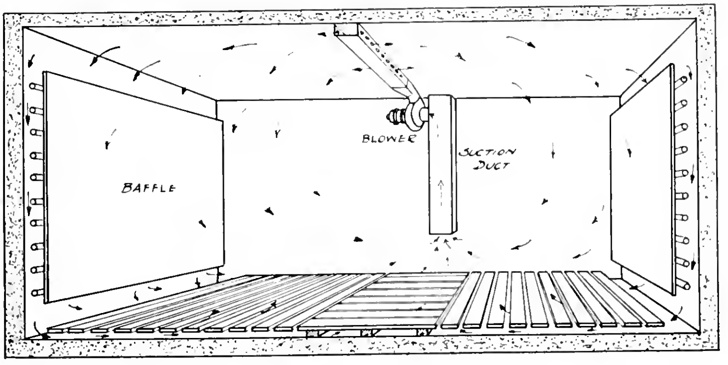
The above described system is more desirable than the "finger duct" systems, in which a temperature difference of approximately one half degree per foot of height is common, or the gravity system with which temperature differences of from one to two degrees per foot of height is usual. A space operating with uniform conditions is very desirable, as the operating personnel have assurance that the thermometer reading is a true indication of what may be found in the space; and, with intelligent use of this information, good delivery is certain.

Britain's Largest Graving Dock

By R. C. W. Courtney

IN order to provide facilities for cleaning and effecting underwater repairs to the new Cunard superliners and other large vessels likely to be built in the near future, the Southern Railway Company of England, which owns the Southampton Dock system, has decided to proceed with the construction of what, when completed, will be Britain's largest dry-dock. The over-all length is to be 1200 feet, with an entrance width of 135 feet and a depth of water over the tops of blocks at ordinary neap tides of 45 feet. The work of construction is being undertaken immediately; in fact the erection of the enclosing banks around the site, which at present consists mainly of tidal mud flats, has already been finished. The work of excavation will be carried out partly by dredging and partly by the use of steam shovels, after which the work of erecting the walls and pumping chambers will be commenced.

At present, however, it is not possible to publish any definite details as to the equipment and ultimate arrangement of the dock, as these matters are still under consideration. In addition to the actual work of constructing the dock very extensive dredging operations must be undertaken, as at present there is no depth of water at the site and it will be necessary to make an entirely new channel at least a mile in length with a depth of 35 feet at low spring tides. This channel, however, will also provide access to a further extension of the new quayage system now being constructed.



Diagrammatic elevation sketch of refrigeration chamber showing arrangement of forced air circulation, baffles, and coils as developed for the protection of Pacific Coast perishable products.

Diesel Engine Lubrication

Part IV. A Discussion of the Special Problems Involved in Oiling the Air Compressor

By Arthur M. Tode

Diesel Engineer, Technical Department, The Texas Company

IN the air injection type of diesel engine, the air compressor can probably be regarded as the heart of the system by virtue of the important part it plays in bringing about combustion. To serve this purpose, however, it is absolutely necessary that the compressor be properly lubricated. It must be served with just the right amount of the most suitable grade of oil, and its lubrication is regarded as the secret of successful compressor operation.

The air compressor as usually installed in higher powered diesel engines will generally have either three or four stages, and will be equipped with suitable intercoolers. The exact quantity of air required for injection is difficult to determine; moreover, since it varies with different fuels, and the compressor must also provide air for starting purposes, ample margin is usually allowed for in the design. The compression of air to pressures in the neighborhood of 1000 pounds will, of course, develop a considerable amount of heat; it is the function of the intercoolers to reduce this heat and thereby keep compressor cylinder temperatures down to minimize the extent of oil vaporization. This is, of course, in the interest of safety, for otherwise accumulations of dust and carbonaceous matter in the intercoolers might easily so restrict the air passages as to increase the velocity and consequently the frictional temperature of the air to a dangerous extent.

Methods of Lubrication

To best effect air compressor cylinder lubrication, each cylinder should be equipped for force feed or pressure lubrication, whereby uniform and measured quantities of oil can be fed regularly. Only a drop or two a minute to the first one or two stages will be necessary.

The third or last stage will usually be abundantly served with oil carried up from the preceding. On the other hand, no hard and fast rule can be laid down in this regard; and the safest course to follow in determining upon the quantity of oil to use is to remove the valves at periodic intervals and examine the cylinder walls. A properly lubricated wall should be coated with a film of oil which will just barely dampen or stain a cigarette paper.

Source and Effect of Moisture

The compression of air and its subsequent cooling in the intercoolers results in the condensation of water vapor which, to a greater or lesser extent, is always present in the atmosphere. Although separators are provided to remove the greater part of the water, yet an appreciable amount is carried along with the high velocity air leaving an intercooler and on into the next stage cylinder. This free water, which has been carried along with the air into the cylinder for final compression, has a washing effect that impairs lubricating oil film. The lack of a proper lubricating film results in blowby of air and excessive wear, especially toward the end of the compression stroke.

In addition, the presence of moisture and air causes the rusting of valves, piston rings, and cylinder walls. The development of moisture will frequently be revealed upon inspecting high-pressure air compressor cylinders after the unit has been shut down. The rust formation which will inevitably follow causes pitting of valves and forms a grinding substance between piston rings and cylinder walls which results in further wear.

To meet the above conditions, it is customary practice to compound many oils for diesel engine air compressor service with a small percentage of high grade fatty oil, which produces a compressor oil capable of developing and maintaining a tenacious water resisting lubricating film while in service and also of preventing rusting or corrosion of the cylinder walls as well as the piston and rings during idle periods.

Overheating and Flash Point

The subject of the heat due to compression causes some confusion in the minds of operators as to the interpretation of the flash points of lubricating oils for air compressors.

Flash point readings are of value only in indicating the relative initial volatility of different oils, and are not definite temperatures at which they "boil" or go completely into vapor corresponding to the boiling point of water. Oils of the proper consistency which leave unusually low carbon deposits are much to be preferred to oils of high flash point. Certain engineers, however, in their eagerness to secure oils of high flash point will frequently overlook this matter of subsequent carbon deposits. This is, of course, erroneous. Laboratory tests have been made with high quality, light body lubricating oils having a flash point between 310 and 325 degrees Fahrenheit. These tests showed that negligible quantities were distilled off up to a temperature of about 615 degrees Fahrenheit, at atmospheric pressure.

It appears that the rapidity of evaporation of an oil, as well as its tendency to carry oil vapors from the cylinder wall film over into the discharge pipes and intercoolers is not governed by the flash point alone. Moreover, it appears that even with such an oil of too high a viscosity for compressor lubrication, a temperature of about 600 degrees Fahrenheit would not generate sufficient vapors to form an explosive mixture.

The discharge temperatures in air compressors range in the neighborhood of 325 degrees to 375 degrees Fahrenheit; and, since the cylinder walls are always jacketed, it is natural that the oil film on the wall should have a temperature lower than the discharge air.

Over-Lubrication

Even the best oil is at times carried over in liquid form with the discharge air when compressor cylinders are over-lubricated. The result will be an accumulation of oil and carbon deposits on the discharge valves which are directly in the path of the hot discharged air. Not being separately cooled like the cylinder walls, these valves have the highest temperature of all compressor parts. This is further proof that high flash point oil is unnecessary as these high valve temperatures cannot condense oil vapors from the colder cylinder walls. It must, therefore, be assumed that carbon which is found on the discharge valves leave the compressor along with the air.

Oils too heavy in body for compressor use will tend to deposit more carbon, will distribute very slowly, and will require excess feed to assure a complete lubricating film being maintained. Over-lubrication, especially where a high carbon residue oil is used, promotes carbon and may be the cause of air compressor explosions. Consequently not only must an oil be most carefully selected, but also, whatever its characteristics, the utmost care should be taken to prevent the use of more oil than is necessary.

Dirt and Carbon Deposits

While dirty air is perhaps one of the most general causes of accumulations of foreign matter, yet, as has been pointed out, an excessive amount of lubricant will tend to develop carbonaceous matter which will materially increase the accumulation of deposits. In addition, an excess of oil fed to the compressor cylinders may bring about leaky valves due to a certain amount of the oil becoming carbonized on the latter. All this, of course, leads to a decrease in operating efficiency, for this carbonaceous matter will also tend to adhere to the piston rings, thereby causing them to become inoperative; furthermore, it will tend to destroy the lubricating film and result in scored cylinders.

Unfortunately there is no oil which will not deposit some carbon. On the other hand, there is a surprising difference in the nature and quality of this carbon deposit as developed by different oils.

Air Compressor Explosions

The different stages of air compressors are designed to compress that air at suitable ratios so as not to overheat the valves in any of the stages and thereby damage the valves and springs. This feature of design minimizes the danger of lubricating oil vapors becoming ignited with consequent explosion.

In cases of air compressor explosions, careful investigation has indicated that the cause was excessive carbon deposit on discharge valves, piping, and intercoolers which have restricted the area of the passages. Such accumulation may interfere with valve seating. Leaking discharge valves may result in a rapid increase of the compressed air temperature to a degree far above the highest flash point of any lubricating oil. The abnormally high temperatures of the air causes the carbon deposits to become incandescent which, in turn, will result in a rapid formation of oil vapors from these deposits as well as from any excess lubricating oil present in liquid form. An explosive mixture is thus formed with the hot compressed air, which is eventually ignited by the incandescent deposits.

Cleanliness of Compressor

It is very desirable to clean out the air compressor system at intervals and wash out the carbon deposits before they grow to large proportions. Kerosene or any similar light oil must under no circumstances be used for this purpose because of the danger of explosive mixtures due to their high volatility and the comparatively large quantity used. Some operators look with favor on the use of soap suds for cleaning, the solution of soap and water being fed into the air intake or through the lubricator about ten times as fast as the usual oil supply. The quantity used must be judged by the amount of carbon found on the valves when they are inspected. After such an application all receivers must be blown down to remove all the soapy water, and oil used again for a time before shutting down, in order to prevent rusting.

Artificial Sunlight Aboard Ship

General-Electric illumination gives daylight effect in the galley and pantry on the steamship Excalibur.

The Fouling of Ships' Bottoms

Part I. Some Notes on the Marine Growths Causing Fouling and on the Effect of Fouling on Ships' Efficiencies

By E. Perry

FOULING on ships' bottoms is an accumulation of plant and animal organisms which attach themselves to and grow on both wooden and metal ships. Among the workers at dry-docks one hears the terms grass, moss, and corals as describing the types of growths found on ships. It is quite evident that the term "grass" is commonly applied to the stems of hydroids, and that the term "moss" is applied to the various seaweeds—usually the green algae which are found so commonly near the water line. The term "shells" includes all shelly growths such as barnacles, oysters, clams, mussels, and even certain Bryozoa; but more commonly barnacles are recognized as distinct from the other "shells," while the corals so frequently mentioned as such are probably Bryozoa, because coral itself has been found only rarely. These groups of organisms—barnacles, algae, hydroids, mollusks, Bryozoa, and tunicates—make up the preponderance of the growths that are found on the bottoms of ships.

It has been the goal all along to prevent the attachment of these organisms, as evidenced by the fact that more than 500 patents have been issued for antifouling materials. The problem is not a new one, for fouling has occurred ever since ships first were used; and it is a matter of history that as early as 200 B. C. the ancients studded their boats below the water line with copper bolts and lead plates, and some were completely sheathed with lead.

Modern methods have centered around the idea of poison paints, and, in reviewing the trend of composition of these paints, one cannot but be impressed that the methods have been governed largely by haphazard experiment and rule-of-thumb procedure, and that apparently precedence has been relied upon more than any analysis of the factors involved. Progress under these conditions was slow. It was eventually realized that a careful study of the organisms responsible for the foul condition would be of considerable value—if not absolutely essential; consequently, in an attempt to obtain more efficient paints, the United States Navy undertook in 1922 an extensive investigation of the entire problem under the direction of the United States Bureau of Fisheries.

The economic importance of the fouling of ships' bottoms may be realized from the following statement of the factors that contribute to the importance of this problem:

- Speed diminished up to 50 per cent.;
- Voyage delayed from 10 to 50 per cent. of total time;
- Increase in fuel consumption up to 40 per cent.;
- Increase in wear and tear on the vessel's machinery;
- Necessity for dry-docking, cleaning, and painting after every six or eight months.

It has been estimated conservatively that more than \$100,000,000 is expended annually by shipping interests of the United States alone because of fouling. When one realizes that fouling often increases the resistance of a ship in water so that the fuel consumption must be increased 30 per cent. in order to maintain a given speed, and that for more than half of the time between dry-dockings for any vessel that operates at sea such costs probably are increased by a minimum of 10 per cent. the expense due to increased fuel consumption alone assumes large proportions. It is the practice of most shipping concerns to clean the bottoms of their vessels every six or eight months. To do this completely and thoroughly, the bottoms are exposed to view, either in dry-docks or marine railways. The cost of maintaining and operating such equipment can be attributed largely to fouling.

In earlier times it was not uncommon for ships to have their entire bottoms incrusted with organisms to a thickness varying from 5 to 9 inches, the weight estimated 300 tons or more. In recent years, due especially to more regular and frequent dry-docking, such conditions are rarely experienced. However, after vessels have been at sea for six or eight months, they often accumulate growths from 2 to 3 inches in depth and frequently carry from 50 to 100 tons of fouling. Captain Henry Williams, C.C., U.S.N. in a recent paper very aptly stated, "Considering the fact that frictional resistance is the most important element in the resistance to propulsion of practically all ships, it is surprising that there has been little investigation of the possibility of reducing skin friction to the minimum. Shipowners seem satisfied that everything is accomplished by the present custom of docking ships periodically for subsequent cleaning of their bottoms and repainting with antifouling compositions. The effort to drive fouled ships at full speed has burned many extra tons of fuel; the normal fuel consumption of ships is very much in excess of what this consumption would be with clean bottoms. While probably it may not be possible to prevent fouling and the consequent increase in fuel consumption, there is room for definite improvement over existing conditions."

Recent investigations by the Navy Department showed a considerable increase in fuel consumption for boats only eight weeks out of dry-dock and on which only small amounts of fouling had accumulated; as these trials were made early in spring-time in the cold waters near Boston Harbor. The results of tests with a new submarine off Provincetown, Massachusetts, showed that the speed attained with a low propeller action was decreased from 9.85 to 9.25 knots; and at high energy input (1050 kilowatts) this was reduced from 15 to 14.5 knots. If there is so great a reduction in speed when the amount of fouling is barely noticeable, the proportionate decrease in the speed of vessels heavily fouled must be very great indeed.

Sir Archibald Denny says, "Found an increase in resistance at the rate of nearly one-half of 1 per cent. per day for periods as long as three months." This would mean an increase in resistance of almost 50 per cent. by the end of this period. The factors that determine the presence and the amount of fouling are very numerous and variable: The season of the year, the weather, and the temperature of the water constitute one group of factors. The condition of the water in harbors, as to salinity and pollution, is another factor. The contour of the ship, which is correlated with the duty and speed of the vessel, and also the waters cruised, all affect the amount of fouling. The length of time between successive dry-dockings and the proportion of this time spent in cruising or in port are very important factors. The nature of the material of which the ship's bottom is made, as well as the paints or other protective coatings, also are of importance.

It is a firmly established belief among mariners that "if a fouled vessel is run into fresh water the growths on its bottom will be removed and the boat again become clean." Unfortunately, there is no definite information on this subject. Among the organisms that cause fouling, almost all are strictly marine forms with but a small percentage able to survive in brackish waters. There cannot be any doubt, then, that many of these organisms are killed if the vessel to which they are attached is transferred into fresh water for a sufficient period of time. This, however, does not imply in any way the natural conclusion that such ships would then be clean. On the contrary, many ships have been observed where the fouling growths were very probably killed by the entrance of the ship into a fresh water harbor, but the fouling material itself on those ships remained secured to the hulls for a considerable time thereafter. The shelly growths of barnacles, oysters, Bryozoa, and the chitinous stems of hydroids have been seen on ships that had been in the fresh water harbor of Philadelphia for more than 12 months. The most notable example of this is the specific case of the destroyers Parker and O'Brien where many barnacle shells were scraped from their bottoms after more than 20 months in polluted fresh water. It is thus evident that although fresh water kills the organisms that cause fouling, it does not remove them or clean the ships unless such growths are succulent or very young. Inasmuch as the resistance to a ship is caused by the shelly structures, whether alive or dead, little benefit will accrue from boats visiting fresh water except that these growths will no longer increase in size.

In order to determine adequately the nature and extent of fouling of ships on the Atlantic Coast, examination was made of more than 250 vessels at the time of docking, and notations were made in each case of the relative amount of fouling and its distribution on the various parts of the hull. For determination of the total amount of fouling present, known areas were scraped carefully and the material collected, measured, and weighed while wet; in some cases the relative amounts of each of the fouling agencies were determined.

The largest number of forms was found in the group of barnacles. These organisms vary greatly in size and shape, many kinds never growing more than one-fourth inch in diameter and often not so high. Some species, however, notably those that attach on ships in tropical waters, grow to a very considerable size—4 inches in diameter and 6 inches in height. Frequently they are found growing one upon another, so that the height of a cluster occasionally may reach 8 or even 10 inches. Most barnacles are protected by means of hard calcareous plates which surround the animal, forming a sort of shell, and two pair of plates that comprise the top or covering of the shell and are arranged like valves. It is between these valves that the animal extends its thoracic appendages when feeding, causing the erroneous impression that the animal is stuck head-first onto the hull or other surface and catches its food with its hind legs. The young barnacles—resembling miniature clams—float and swim about for a long time, often two or three months, and finally attach by means of seemingly adhesive pads on the tips of the two antennae. After attachment, they metamorphose into the adult stage, miniature at first but growing rapidly to full size.

The hydroids were the next most numerous animal group found during the investigation of the 250 ships. Hydroids usually are colonial in their growth; the growth begins after attachment of a free-swimming larva, which changes its form completely upon fixation and produces a stalked growth or stolon. In many forms this stalk branches profusely and forms a tree-like structure, often attaining a length of six or eight inches. Here, too, the living animal is enclosed within a chitinous sheath which persists for many months after the death of the organism. Since these colonial organisms obtain their food by means of feeding polyps which are situated at the ends of the stalk, or its branches, and since all other parts of their bodies are protected by the chitinous covering, it becomes obvious that after attachment, as in the case of barnacles, they are completely unaffected by any character of paint film. Therefore the problem of prevention of fouling resolves itself into one of prevention of attachment of these forms.

Bryozoa are a group of organisms abundantly present on all marine coasts. The great majority of them form colonies of thousands of relatively small individuals, each of which is surrounded by a more or less chitinous or calcareous shell. These growths frequently vary greatly in their form and may produce "sea mats" and coraline structures 6 to 8 inches in height and 12 inches in diameter. Each colony originates from a single minute larva which has a free-swimming period persisting from one to many hours.

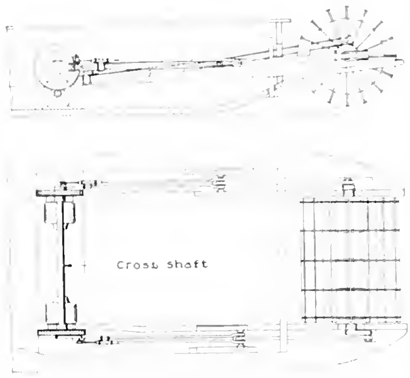
The algae were the most ever-present form, with the possible exception of the barnacles. They frequently formed heavy mats of growth, extending from the water line to from 1 to 8 feet below. Although individual growths might be of little consequence, the large numbers made the mass appear much like a beautiful lawn. In many cases the growths of algae would attain a length of 7 to 10 inches. It was interesting to ascertain that many of this species were found indifferently in both salt and fresh water.

Upon summarizing the results it was recorded that of the 250 ships examined: 52 (21 per cent.) were heavily fouled; 67 (27 per cent.) were moderately fouled; 98 (39 per cent.) were lightly fouled; and 33 (13 per cent.) were not fouled. Further, of the 217 vessels that were fouled: 152 had barnacle growths; 105 were foul with algae; 91 with hydroids; 87 with Bryozoa; 37 with mollusks; 39 with tunicates and Protozoa.

A New Transmission Gear for Stern Wheelers

By R. A. Beekman

Federal and Marine Department, General Electric Company



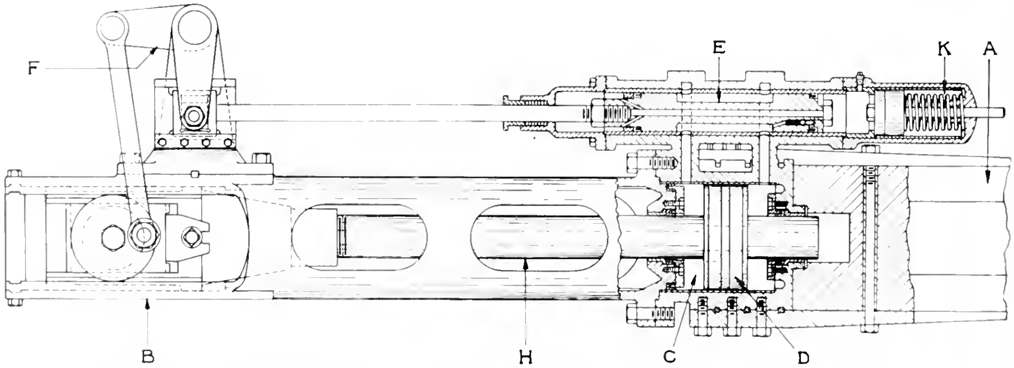
Arrangement of motor drive for stern-wheel river craft.

RIVER men seem to be almost unanimous in the opinion that for average river conditions the stern wheel is the most satisfactory type of propulsion; therefore, in considering the application of modern propelling machinery to such boats, we naturally accept the stern wheel. When we attempt to install modern machinery involving either steam turbines or diesel engines connected directly or by means of electric transmission to the stern wheel, we are confronted with the problems as to how to effect the mechanical connection between the prime mover or the electric motor, and the wheel.

In small sizes this has been successfully accomplished by means of shafts and gears, or chains, but these offer great difficulties when applied to boats demanding 1000 to 2000 horsepower and above. When one realizes the large torques involved in consuming this horsepower at speeds of 15 to 30 revolutions per minute, it is not surprising that this feature has been a cause for conern. After very careful analysis, several groups studying the problem independently have arrived at the conclusion that the use of connecting rods, or pitmans, offers the most satisfactory solution. This type of connection has been successfully used for many years with the old "grasshopper" type of steam engine and certainly has demonstrated its merit.

However, difficulty arises with the pitman type of connection when we attempt to apply any type of modern power which delivers practically a uniform torque throughout a revolution of the wheel. In the case of the "grasshopper" reciprocating engine, steam is cut off before the end of the stroke and the idle pitman is carried over the dead center by the working one. However, with any type of motive power delivering practically constant torque, there is grave danger that during maneuvering the driving cranks on either side of the boat will be in opposition to each other. This is due to the clearances which naturally develop in the bearings and which will permit of a driving crank, when near dead center, dropping by and causing a cramping action. This analysis is by no means based on theory only, as actual experience has been had with electric locomotive design incorporating similar features.

The General Electric Company has a solution for this problem which it believes meets the requirements fully. It proposes to install in the pitman a hydraulic connection, as shown by the drawing wherein A is the forward end of the pitman and B is, in effect, this forward end made to surround and include the driving crank. The driving effort of the crank is delivered through the connecting rod H, to which is attached a piston D This piston works in a cylinder C filled with a hydraulic medium, such as oil. Mounted on top of the cylinder is a piston valve E, which is actuated by the crank through the linkage F. During the advantageous working angle of the crank, the two ends of the cylinder on either side of the piston are sealed off



Detail of the new General-Electric hydraulic connection between pitman and crank pin for stern-wheel drive.

from each other by the valve E, so that a rigid connection is maintained; as the crank approaches dead center, the two ends of the cylinder on either side of the piston are interconnected, so that the piston is allowed to float freely, thereby permitting the working pitman to carry the other past dead center, much as is the case with the "grass hopper" type steam engine. The portions of the mechanism filled with the hydraulic medium are all self-contained; i.e., there is no piping external to the device itself.

A reserve supply of oil is contained in the valve chest, which is used to keep the working passages filled as any slight leakage may occur; this is accomplished through the medium of a piston actuated by spring K. For the purpose of indicating the necessity for refilling the system, the stem of the piston upon which the spring K operates is brought external. The makeup medium may be supplied without disassembling the mechanism, through means of an ordinary hand pump. As the forward end of the pitman is made to surround the crank, as illustrated at B, there is no tendency for the pitman to buckle due to the interposition of the hydraulic link between the driving and the driven members.

This arrangement has the marked additional advantage of setting a definite limit to the stresses set up in the crank pins, pitman, etc. This is due to the ability to choose the point at which the load is relieved on side approaching dead center.

It should be understood that with this arrangement the driving cranks will be cross-connected; i.e., electric motors or other constant torque motive power will not be independently connected to the driving cranks. If this cross-shaft were not provided, its individual motor would accelerate each crank a little when it became idle and as each dead center was passed, until all the clearance provided for by the hydraulic connection would disappear and we would not have a solution to the original problem. This cross-shaft may be placed at any convenient point in the reduction system between the motor and driving cranks, so that it may be placed below the deck and remove the objection that it interferes with the use of this space for stowing cargo or other purposes.

Our illustration shows an arrangement whereby the weight of the motors and gearing is placed well forward. This is understood to be a very desirable feature for this type of boat. As the ordinary pitmans would be too long with such an arrangement, they are shown divided in two parts and supported at approximately their center points by means of sliding cross heads.

The patent covering this device is owned by the General Electric Company, but it is not at present the intention of that company to manufacture it. However, the company will be pleased to cooperate in the design and application for any particular installation.

Special Design Launch for Public Health Service

We illustrate herewith launch Q 7 recently built for the United States Public Health Service to designs by P. W. Clark, naval architect of Washington, D.C. The principal characteristics of the craft are:

Length over-all	40′ 11″
Length between perpendiculars	40′ 0″
Beam, over guards	13′ 9″
Beam, molded	13′ 0″
Loaded draft	4′ 10″
Horsepower	45
Revolutions per minute	754
Knots	8.85
Slip, per cent.	27½

The conditions of the design limited length and draft and required that the launch should carry on these limits the maximum of passengers and freight, she being intended for ferry service between quarantine stations located on islands and ashore.

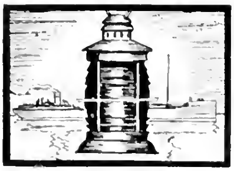
The engine is a Fairbanks-Morse diesel with four 6x6½-inch cylinders and selective gear transmission and drives a Columbia Type G, 3-blade, 34-inch diameter 20-inch pitch propeller. This engine is installed in a light and airy engine room with a removable hatch to allow lifting out the engine or other equipment. Ventilation is amply provided by mushroom ventilators and lattice doors in the bulkheads. Under the stern deck is a large cargo hold capable of carrying several tons of cargo and covered with a water-tight hatch.

The Q-7 has proved unusually seaworthy for her size. On a run from Philadelphia to Charleston during which she encountered very heavy weather, both hull and power plant functioned 100 per cent. It is noteworthy that though the Fairbanks-Morse engine on the high speed run was turning 100 revolutions per minute above its rated speed both engine and propeller performed remarkably well and there was practically no vibration.

TRADE LITERATURE

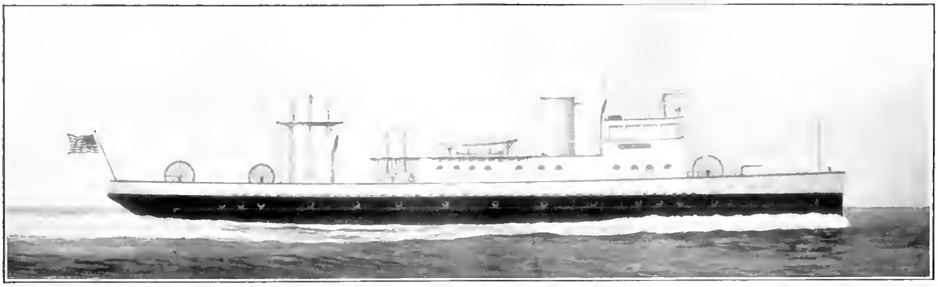
Revolution Indicator System — Bound in a very striking stiff paper cover, a four-page catalog has just been published by the Sperry Gyroscope Company, Inc., Brooklyn, New York, presenting in very readable form the device that is such an important contribution to safety and economy on seagoing vessels.

The United States Public Health Service launch Q-7, large capacity on small dimensions and fair speed at low power.



Marine Equipment

NEW FIRE BOAT — DIESEL GENERATOR
ELECTRIC TRUCKS — NEW STEAM ENGINE



Artist's sketch of new fireboat now building for the City of New York.

World's Most Powerful Fireboat

Todd Shipyards Building 2750-Horsepower into New Fire-Fighting Craft for New York Harbor Protection

CONSTRUCTION work on New York City's new fireboat, the largest and most powerful of its kind in the world, was started January 31 in the yards of the Todd Shipbuilding & Drydock Company of Brooklyn.

The new fire fighter, designed by Henry J. Gielow, Inc., will have greater capacity than any craft of her type ever built, according to Joseph A. MacDonald, president of the architect's organization. When the boat goes into action, water may be pumped through a battery of 32 nozzles and hose connections at a rate of 136,000 pounds per minute with a pressure of 150 pounds per square inch, or the pressure may be doubled and the amount of water cut to 8,000 gallons per minute.

The boat will be 130 feet long over-all, built to the American Bureau of Shipping classification. It will have a beam of 26 feet, a draft of 8 feet, 6 inches, and a speed of 18 miles per hour, driven by Sterling Viking motors with a total development of 2130 horsepower. Altogether, there will be five engines, including auxiliaries, so that the craft will carry 2750 horsepower. The two main propulsion motors will operate on 1165 horsepower each. A single engine of 550 horsepower will be used to hold the boat against the terrific water pressure which would tend to drive it away from the fire.

The water will be drawn into the boat through two intakes on either side of the craft by means of four centrifugal pumps which will discharge it through a combination of hose outlets and nozzles. On the fire tower, three monitor nozzles will have capacities of 3000 gallons per minute each, while two units on the pilot house, one on each of two secondary fire towers amidships, and one on the forward deck will be able to throw 2000 gallons per minute each. A battery of 24 outlets will serve as 3½-inch hose connections for inland fighting. For this purpose, 2500 feet of hose will be carried on one reel, 1500 feet of 2½-inch hose will be wound on another, and 500 feet of 1½-inch line will be available on the third.

The light draft of the boat will enable navigation into the shallow creeks and inlets along the waterfront, while the length has been fixed with the purpose of allowing easy maneuverability between vessels in slips. The height has been limited to 23 feet above the water to enable passage under bridges. The hull is reinforced forward with extra plates and stiffeners so that the boat may ride upon ice and crush it.

Fuel will be carried in two 3000 gallon tanks, one forward and one aft. This amount will give the boat full fire-fighting capacity for 24 hours. The tanks will be of a non-explosive type, protected by an Aqua system with no air space above the gasoline level. In addition, baffle plates will be used to check the swashing of fuel and the containers will be guarded by encasements, which, in turn, will be protected by a carbon dioxide fire-fighting system. The gasoline compartments may be flooded with water if necessary.

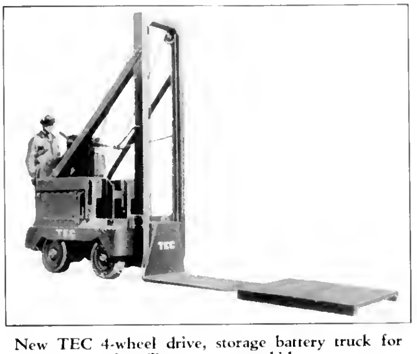
To fight oil fires, 4000 pounds of Foamite will be carried and may be used at the rate of 500 gallons per minute at a pressure of 100 pounds per square inch. For fighting fires under wharves, a 14-foot steel power boat equipped with a centrifugal pump will be carried.

The designers have given consideration to self-preservation of the fireboat by arranging for a spray system that will be capable of casting a complete water curtain over the entire craft. Fresh air to the engine room and all quarters will be filtered and washed and can be recirculated without danger of drawing smoke and flame into the hull. No woodwork is to be used in the construction; even the furniture will be of metal.

The crew's quarters will be steam heated, and special drying cabinets will be installed. Cooking will be done on an electric stove. The boat will be equipped with wireless telephone and will have sending and receiving apparatus to keep in communication with the municipal broadcasting station, WNYC. The total cost of the craft will be $582,500.

Electric Skid-Handling Truck

A NEW four-wheel drive skid handling truck has recently been added to the line of materials handling equipment manufactured by the Terminal Engineering Company, New York.



New TEC 4-wheel drive, storage battery truck for handling cargo on skids.

This TEC machine is small enough to work in box cars, yet carries its loads of 3000 pounds in an overhung position. The skids used with this new elevated truck are the lowest possible and hence the mose economical. The skid height need only be 2 inches below the platform. They can be easily made from scrap lumber, using 2- x 4-inch boards on their flat sides for the legs. Having these legs run the full length of the skid gives a "web footed" effect so that the skid is more stable when stacked than one having four high legs at the corners. There is also no tendency for the board skid legs to damage the goods on the underneath skid load when stacked, as so often occurs with the four corner type of skid leg.

Both the travel and elevating speeds of the new truck enable it to perform work unusually fast. Having a four-wheel, four-motor drive, the truck travels 10 miles an hour empty and 7-9 miles an hour with 1½-ton load. The elevating speed varies from 25 to 40 feet per minute with the standard motor, but increases up to a maximum of 60 feet per minute if a special high speed hoist motor is used.

The loads are all carried in an overhung position with no wheels directly under the load. The overhung design enables tiering skids without the aid of a helper, thus speeding up the work and lowering the operating costs.

The truck is operated from a storage battery, which is in a steel compartment, placed over the wheels at the driver's end, to act as a counterbalance. As with all equipment made by the Terminal Engineering Company, this elevating truck is designed for quickly and easily interchanging batteries for continuous operation, 24 hours a day if desired.

Speeds with safety are obtained on these trucks by using such devices as: (1) an automatic stop on the up-stroke of the table; (2) two independent sets of brakes, (a) mechanical on two wheels and (b) electrical on four wheels; (3) controls located within outer edges of truck at all times.

Foster Wheeler Enters Boiler-Building Industry

THE Foster Wheeler Corporation announces that it has entered the field of boiler manufacture and is prepared to furnish all types in the entire range of sizes and pressures. Acquisition of the plant and business of the D. Connelly Boiler Company of Cleveland, has placed the Foster Wheeler Corporation in a position to cover the boiler field.

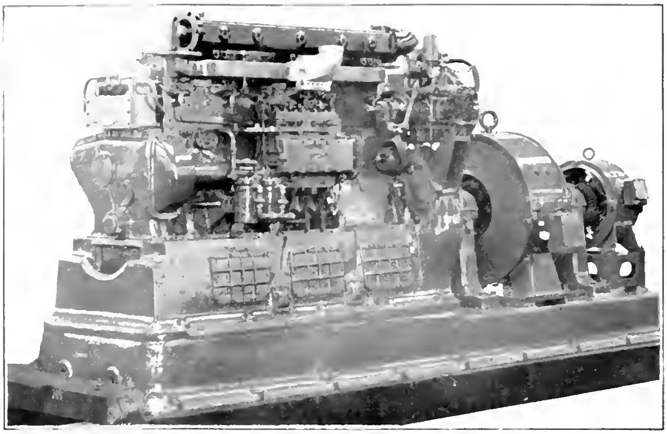
The Connelly Company has been a progressive builder of boilers for more than fifty years. In that time, it has built up excellent shop facilities and organization. It 'has made notable installations among which may be cited both the largest boiler unit and the boiler for highest pressure in public utility service in the United States.

The Foster Wheeler Corporation has been supplying complete steam generators for some time, and has produced the various parts in its own works, with the exception of the boiler proper. The combination of an old established boiler shop with the present Foster Wheeler plants and engineering aggressiveness will be of special interest in the industry.

The units to be produced include: forged steel, sectional header cross drum boilers; four drum and three drum bent tube boilers; three drum "low head" bent tube and two drum bent tube boilers. For marine service there will be offered, as in the past, cross drum steam generators of both box header and sectional header designs; three drum "A" type and two drum low head units.

With the addition of the boiler to its products, the Corporation can now undertake single contracts with undivided responsibility as to design, construction, and operation for complete steam generators, including pulverized fuel equipment, water cooled furnaces, superheaters, economizers, and air heaters. The possession of a boiler shop fully equipped for heavy work has the further advantage of enabling Foster Wheeler to meet all of its requirements for heater and evaporator shells as well as for fractionating and stabilizer towers used extensively in its petroleum refining and gasoline recovery plants.

Twin-Diesel Installation on Gasoline Tanker

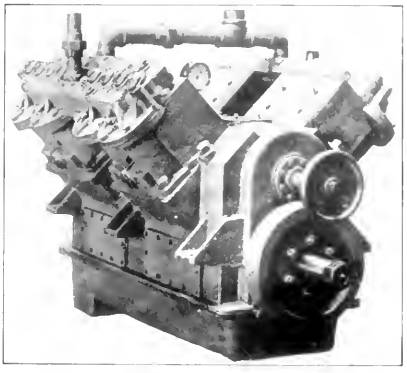


Buda-M.A.N. diesel generating set of 180 horsepower for Gulf Refining Company gasoline tanker.

THE Gulf Refining Company, Jacksonville, Florida, has purchased two 180-horsepower, 6 cylinder, Buda-M.A.N. diesel engines, through the Gibbs Gas Engine Co. at Jacksonville. This is to be a twin engine installation for electric propulsion of a gasoline tanker, intended for operation in Florida waters. The tanker is 149 feet over-all, 32 feet wide, with a capacity of 117,000 gallons.

The Buda diesel is a high speed, light-weight type, operating on the 4 stroke cycle principle and is manufactured by the Buda Company, Harvey, Illinois, under license from the M.A.N. Company, Augsberg, Germany.

A Unique Steam Engine



The Hayden-Davis 8-cylinder steam engine.

THE Hayden-Davis Engine Company of Oak Park, Illinois, has recently developed, after considerable research and preliminary design, a very simple, compact, 8-cylinder, poppet valve, high speed, fully enclosed, steam engine. As will be noted from the illustration, this engine is an adaptation to steam of the V-type, multicylinder, internal combustion engine that has proved its usefulness so widely in the automotive field.

This engine can be installed and used anywhere that a gasoline engine or an electric motor can be operated. It runs as smoothly as an electric motor; and its weight is only 125 pounds per square foot of base. The piston travel speed is low, only 550 feet per minute at 600 revolutions per minute, stroke being $5\frac{1}{2}$ inches and bore $4\frac{1}{2}$ inches. With steam at 125 pounds pressure, this motor will generate 130 horsepower at 600 revolutions per minute. Its weight is 1550 pounds. It is equipped with a balanced valve metal diaphragm governor that holds speed variation within 2 per cent. from quarter load to full load. Force feed lubrication is applied to all moving parts. Over-all dimensions are: Length 54 inches; width, 31 inches; height, 31 inches.

The makers claim that this unit will deliver power economically and that its size and cost relative to delivered power are lower than those of any other prime mover.

The Hayden - Davis 8-cylinder steam motor is recommended in condensing and noncondensing installations for the following applications:

Generators	Crushers
Pumps	Pulverizers
Compressors	Grinders
Blowers	Hoists
Exhausters	Mixers

Trade Literature

G-E Industrial Heating Devices is a leaflet describing and illustrating such devices as melting pots, portable furnaces, soldering irons, strip heaters, and cartridge units.

GEA-1252. DR9440-LS415 Hatchway limit switch for control circuits.

GEA-246B. General purpose synchronous motors "7500 series."

GEA-973A. CR3100 Drum Controllers for series, shunt, or compound-wound, direct-current motors.

GEA-818A. 16-page catalog on Nonmetallic Gears and Blanks with complete dimensions, prices, and instructions for ordering Fabroil and Textolite gears.

G-E Vitreous-Enameled Resistors. Finely illustrated catalog with complete catalog of dimensions.

Arc Welding Supplies is the title of Bulletin Section 3304 issued by The Lincoln Electric Company and which should be of interest to all shop foremen and welders.

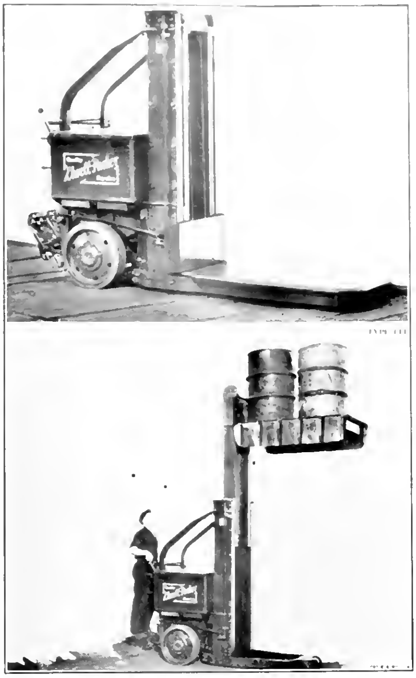
ERRATA

In the April issue, in the caption at the top of Page 145, an inadvertent error gave the Japanese motor tanker San Pedro Maru to a corporation having no interest in that vessel.

This good tanker was built and engined by the Nagasaki Works of the Mitsubishi Shipbuilding Company and is owned and operated by Mitsubishi Shoji Kaisha, Ltd. Her engines are Mitsubishi-Sulzer diesels.

Telescoping, Electric, Tiering Truck

IN the waterfront warehouse or the pier shed, floor space is frequently at a premium, especially so since the modern freighter with her huge cargo capacity must in many ports use the narrow piers designed for the requirements of much smaller average vessels of 20 or 30 years back. Hence, there has sprung up a demand for easily maneuvered trucking, tiering, and stacking machines to build up or break down huge piles of general cargo in these restricted spaces.



The Elwell-Parker new telescoping, tiering truck, normally and extended.

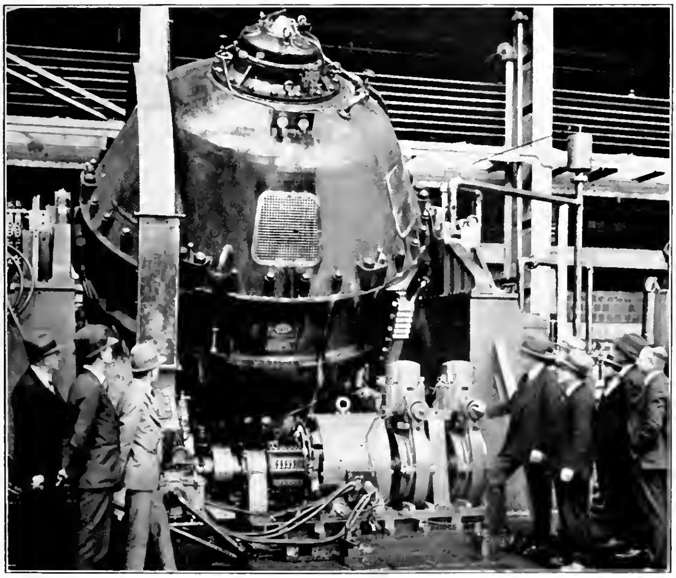
The Elwell-Parker Electric Company of Cleveland is continually developing its line of materials handling machinery, and recently has introduced a new type (ELD-4) electric skid handling and tiering truck with a number of remarkable features that make it much more adaptable to many conditions than the ordinary tiering truck.

In many pier sheds there are numerous overhead obstructions that limit the height of machines passing along aisles or through wall or bulkhead openings. To overcome this handicap engineers have developed telescoping upright members for tiering, or Hi-lo trucks. The machine illustrated has this feature incorporated in a very efficient manner.

This particular electric truck is 38 inches in width, 100 inches in length, with a 26- x 24 inch platform that tiers in the open to a height of 10 feet yet will pick up the load of 4000 pounds at 7 inches above the floor in an 83-inch high railroad car. Likewise, it will stack in a car to the roof for its platform rises to 61 inches before the secondary uprights begin to rise. This truck steers on all four rubber tired wheels and operates in 70-inch aisles. It may be driven through a 7-foot door 42 inches in width.

Standard automatic safety control of travel and hoist motors, cable lift, automatic elevating hoist limit, cutouts, and accommodation of Edison or Exide batteries or Ready-Power gas-electric power is provided. This machine is built in 3000-, 4000-, or 6000-pound capacities and with 7-inch or 11-inch height platforms.

The Elwell-Parker Electric Company is represented on the Pacific Coast by Ira G. Perin, San Francisco; and by the Colby Steel and Engineering Company, Seattle, with large stocks at both cities.



Eleven-foot gyro-stabilizer being tested at South Philadelphia.

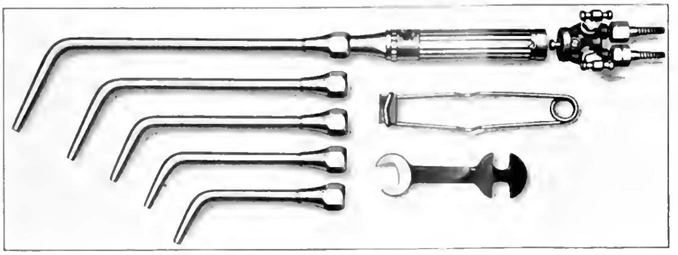
Test of Gyro-Stabilizer

AN 11-foot gyro-stabilizer, weighing 120 tons and designed to prevent rolling of a ship in a seaway, recently was tested before prominent marine architects and engineers at the South Philadelphia Works of the Westinghouse Electric and Manufacturing Company.

Weighing 110,000 pounds, the huge "top" spins at a speed of 930 revolutions per minute within the stabilizer casing, actuated by a built-in 200-horsepower motor.

The stabilizer was built by the Westinghouse company to the order of the Sperry Gyroscope Company of New York for a foreign shipbuilder.

Engineers at the test said the gyro, processed by an external electric motor of 75-horsepower, would keep a 450-foot ship within two degrees maximum roll.



Prest-O-Weld blowpipe and outfit Type W-105.

Two New Prest-O-Weld Blowpipes

THE Linde Air Products Company, 30 East 42nd Street, New York, has recently added two new welding blowpipes to its line of Prest-O-Weld medium pressure apparatus, presenting an entirely new idea in blowpipe design. A detachable valve body, to which the handle is secured by a simple and convenient locking device, enables the operator to change quickly from the standard to different handles without detaching hose or hose connections and without the use of a wrench.

Designated as the Prest-O-Weld Type W-105 Welding Blowpipe and Type W-106 Welding Blowpipe, these two new additions to the line have been designed to give Prest-O-Weld users a medium pressure blowpipe comparable in range to the Oxweld Type W-17 Welding Blowpipe.

Both blowpipes are designed for use with new type, one-piece, hard drawn copper welding tips. Although regularly supplied with a head angle of 60 degrees, this may be changed by the user to any angle desired. Ten different sizes of tips, Nos. 4 to 13 inclusive, are available for use with the Type W-105 handle. The Type W-105 Blowpipe, as furnished complete, includes tips Nos. 4, 6, 8, 10, and 12. A stem adaptor is available so that tips for the Prest-O-Weld Type W-107 Aircraft Welding Blowpipe may be used with the Type W-105. This makes the new blowpipe adaptable for work ranging from the lightest sheet metal welding to heavy welding work requiring a No. 13 welding tip. It is therefore well suited to general ship welding.

The Prest-O-Weld Type W-106 Blowpipe is similar in design to the Type W-105, but smaller. It is supplied with five sizes of tips, Nos. 3 to 7 inclusive, which cover a wide range of usefulness. The Type W-106 Blowpipe is particularly suited to light welding and makes a very effective tool in the shipyard or aboard ship for bronze welding of small parts, for soldering, and for sheet metal work.

A stem adaptor is available so that Type W-107 tips may be used with the Type W-106 handle.

New Veedol Lubricant

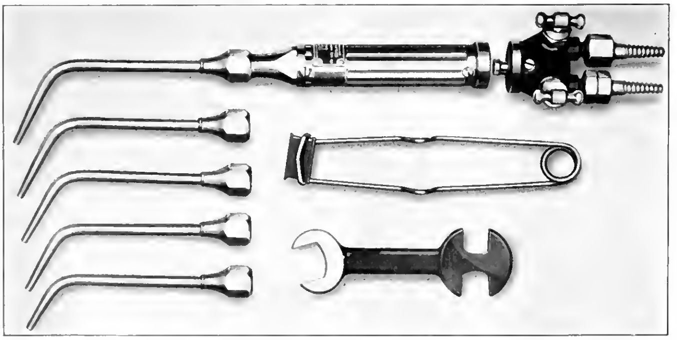
WITH a 50-years' history of operating the largest refinery of 100 per cent. Pennsylvania crude oils in the world, and an investment of over $2,000,000 in new and elaborate equipment, the Tide Water-Associated Oil Company recently announced a new 100 per cent. Pennsylvania Veedol motor oil whose unique qualities have made it immediately a center of interest to the entire oil industry.

"The statement that the new Veedol is the finest lubricating oil ever produced may seem like the conventional claim made from time to time by a number of motor oils too eager for the spotlight," declared Frank L. Wagar, Veedol sales manager for the Associated Oil Company, Veedol distributors on the Pacific Coast. "But we car support every statement made. In the first place, the new Veedol has better viscosity and stands up better under motor heat than does any line of 100 per cent. Pennsylvania motor oils. Moreover, it has the greatest fluidity at zero, lubricating perfectly at 20 degrees below zero. These two facts mean that in actual use it will provide efficient lubrication at any motor temperature, throughout a heat range wider than that which any other oil could cover effectively with perfect safety.

"Too, the new Veedol is 99.1 per cent. free from carbon-forming compounds, and also free from wax. Thousands of miles of cruising will leave the motor clean from carbon deposits.

"Precision machinery, such as has never before been used in making any oil, controls absolutely the quality of this new oil.

"And finally, the new Veedol crude comes from the heart of the Bradford field, 8000 barrels a day, straight to the refinery through Tide Water's 288-mile pipe-line. Thus, starting with the finest Pennsylvania crude and passing through the world's most modern and largest refinery, the new Veedol may justly claim the distinction of occupying a unique position and setting new standards of lubrication."



Prest-O-Weld blowpipe and outfit, Type W-105.

American Shipbuilding

Edited by H. C. McKinnon

Bids Called on Alaska Service Vessel.—Bids were to be opened April 25 at the office of the U. S. Department of the Interior, Consolidated Purchasing and Shipping Unit, 422 Bell Street Terminal, Seattle, Wash., for the construction of a modern, wooden hull, motorship for the Bureau of Indian Affairs. The vessel is for the Bureau's service among the natives of Alaska in place of the steamer Boxer which has been in use for many years.

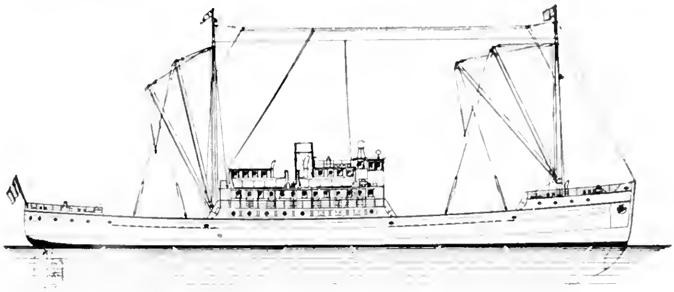
The vessel has been designed by W. C. Nickum, naval architect, with offices Room 400, Polson Bldg., Seattle. She will have a single propeller, will be of the heavy wood construction necessary in the ice-infested waters of the North, and will be powered with a heavy duty, medium speed, diesel engine of from 1200 to 1500 brake horsepower.

The dimensions of the vessel are:

Length over-all	225′ 0″
Length between perpendiculars	210′ 0″
Beam molded	41′ 0″
Beam extreme	42′ 0″
Depth molded	21′ 6″
Loaded draft	16′ 0″

The vessel is to have a speed of about 14 knots. Accommodations are to be provided for 22 passengers in first class and 20 in steerage. All auxiliaries are to be electrically operated. Fuel capacity will be sufficient for a cruising radius of 10,000 miles; and she will have general cargo capacity for 1500 tons and 16,000 cubic feet of refrigerated holds.

The vessel's construction and her operation are under the supervision of the Seattle office of the Department of Commerce of which J. R. Ummel is purchasing agent and office manager.



Outboard profile of new Alaska Service Vessel.

Contract Awarded for Vancouver Ferryboat.—On a low bid of $40,275, the Boeing Aircraft Co. of Canada, Ltd., Vancouver, B. C., was awarded contract by the North Vancouver City Council for construction of an automobile ferryboat for operation between North Vancouver and Vancouver.

The ferryboat is to be 130 ft. long, 43 ft. 6 in. beam, and powered with a 6-cyl., 250-horsepower Union diesel engine. The engine will be connected through clutches to a propeller at each end of the hull and will be equipped with two Kingsbury special thrust bearings. A Lister diesel generating unit will supply electricity for auxiliary power and lighting.

The new ferryboat will have capacity for 34 automobiles on the main deck and accommodations for 100 passengers.

The North Vancouver City Council received the approval of the voters a few weeks ago for the construction of a ferryboat at a cost of $225,000, but decided that, rather than wait for the sale of bonds for this amount, they would build a smaller vessel out of funds immediately available.

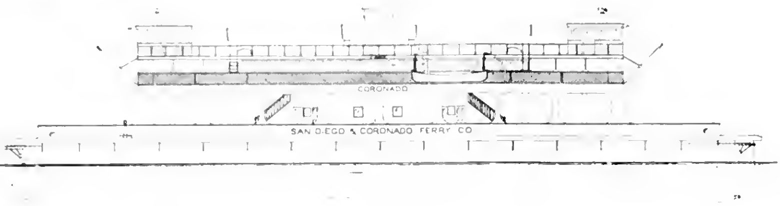
Contract Awarded for Supply Ship.—The Berg Shipbuilding Company, Seattle, Wash., has been awarded contract for construction of a new inspection vessel for the U. S. Army Engineers, San Francisco Office, for service in Hawaiian waters. The boat will be similar to the Suisun, 65 ft. long, 16 ft. beam, and of 40 tons displacement. She will be powered by an Atlas Imperial diesel engine.

The bid submitted by the shipyard was $35,907.60 and delivery at Honolulu in 115 days.

Ferry Rebuilt.—The Ballard Marine Railway Company, Seattle, Wash., has just completed rebuilding of the automobile ferryboat Whidby for the Puget Sound Navigation Company's Black Ball Line operating between Bellingham, Anacortes, and San Juan Islands. The vessel was lengthened by 35 feet, widened 8 feet, and equipped with a new 6-cylinder, 600-horsepower Washington diesel engine. Her accommodations were completely renovated and she goes back into service an up-to-date and virtually new craft.

Hancock Yacht Launched.— Velero III, finest yacht yet to be constructed on the Pacific Coast, was launched by the Craig Shipbuilding Company, Long Beach, Calif., on April 1. The Velero III was ordered by G. Allan Hancock, Los Angeles capitalist and was sponsored by little Miss Patricia Anne Zeiser, 3-year old granddaughter of the owner. The yacht is 195 ft. long, 30 ft. beam, and is to be propelled by twin 6-cylinder Winton diesel engines. Her accommodations and equipment will represent the latest and most efficient types for comfortable and safe sea travel.

United Gets Repairs on Army Transport. — United Engineering Co., San Francisco, was awarded contract April 17 by the U. S. Army for repairs, alterations, and betterments to the transport Cambrai on a low bid of $58,738 and 16 days.



Fourteen feet longer than her running mate shown here the new Coronado ferry will be identical in design of hull.

New Double-End Auto Ferry.—We illustrate herewith the outboard profile of the new double-ended, diesel-electric, automobile ferry for the San Diego and Coronado Ferry Company which is under construction at the yard of The Moore Dry Dock Co., Oakland, Calif.

The general dimensions of the vessel are: Length over-all, 204 ft. $10\frac{1}{4}$ in.; length between centers of rudder pintles, 192 ft. 8 in.; breadth of steel hull at deck, about 43 ft. 8 in.; breadth over guards, 60 ft. $2\frac{1}{4}$ in.; depth at sides, molded, about 14 ft. 11in.; draft molded, light, 9 ft. 1 in.

The hull is to be of steel construction, the sides of the superstructure on the automobile deck to be of open panel type. The main deck will be able to carry about 58 automobiles. The upper deck will carry about 200 passengers, accommodations including seating arrangements and lavatories. The vessel is to have a rudder at each end, arranged for pilot house control.

The propulsion plant will consist of three 4-cycle, 6-cylinder Atlas-Imperial diesel engines, of 350 brake horsepower each at 275 revolutions per minute. Each engine is to be direct-connected to one 225-kilowatt, 167-volt, Westinghouse direct-current generator and one 30-kilowatt, 125-volt, direct-current overhung exciter. These three generators will be connected through Ward Leonard control system to two 750-shaft horsepower, single armature, direct current, 180-R.P.M., Westinghouse propelling motors. These will be installed, one at each end of the vessel operating a propeller at each end of the vessel.

Diesel Yacht Ordered.—The Defoe Boat & Motor Works, Bay City, Mich., has received an order for a diesel-powered wooden yacht for S. L. Avery of Chicago. The yacht will be 91 ft. 6 in. between perpendiculars, 15 ft. 9 in. beam, and 4 ft. 6 in. loaded draft, with 1000 indicated horsepower engines.

Barges Ordered from Dravo.—The Atlantic Refining Co., Philadelphia, has ordered a steel oil barge 192 by 40 by 11 ft. 9 in. from the Dravo Contracting Co., Pittsburgh. This shipbuilder also has a recent order for two barges for the U. S. Army Engineers Office, Pittsburgh, dimensions 100 by 26 by 7 ft. 3 in.

Barge Order Placed at Hoquiam.—The Chilman Shipyards, Hoquiam, Wash., has an order for a wooden barge 100 by 40 by 10 ft. 6 in., to have deadweight carrying capacity of 800 tons and 1200 tons displacement.

Ferry Being Reengined. — The ferryboat Liberty of the Kitsap County Transportation Company is undergoing reconditioning at the yard of the Barbee Shipbuilding Co., Ballard, Wash. She will have a new 8-cylinder, 560-horsepower Washington diesel installed, manufactured by the Washington Iron Works, Seattle. When reconditioned the ferryboat is to be operated on the Ballard—Port Ludlow route. The main deck has been considerably enlarged for automobiles and the new engine will materially increase the ferry's speed and operating efficiency.

Bids Called for Derrick Barges.—Bids were opened April 28 at the office of Major Oscar O. Kuentz, U. S. Army Engineers, Portland, Ore., for the construction of four steel-hull derrick barges. The dimensions of the barges are 50 ft. long, 22 ft. beam, 3 ft. depth. They are destined for use in pipe-line dredging work on the Columbia River Channel. Two are to be equipped with steam hoisting engines and fuel oil tanks already in possession of the government. The other two are to have gasoline hoists.

New Ship Repair Plant.—It is reported to us that L. K. Siverson, formerly sales manager for the Union Plant of the Bethlehem Shipbuilding Corp., Ltd., at San Francisco, has purchased the Columbia Machine Works, 160 Spear Street, and plans to engage in marine engine repairs and general machine work.

Bids Called for Quarantine Tug.—The U. S. Public Health Service, Rosebank, Staten Island, N. Y., has called for bids for the construction of a steel hull quarantine tug to be 100 ft. long, 23 ft. beam, and 11 ft. depth. The tug is to have a diesel-electric power plant developing 325-horsepower and controlled from the pilot house.

Carfloat Contract Awarded.—The McClintic-Marshall Co., Pittsburgh, Pa., has been awarded contract by the Inland Waterways Corp., Washington, D. C., for construction of two carfloats to be 285 ft. long, 56 ft. beam, and 10.6 ft. depth. The barges will each have three railroad tracks on a depressed deck with capacity for 15 cars. The carfloats are intended for use by the Federal Barge Line at Cairo, Ill.

United Consolidates Crane and Shewan Plants. — Consolidation of the management and operation of the Shewan and Crane Plants, both in Brooklyn, of United Dry Docks, Incorporated has been announced by Joseph W. Powell, president. Effective April 1 the plants will be under the management of Walter D. Crane who has been manager of the Crane Plant. His assistants will be F. F. Potter who was manager of the Shewan Plant, and Frank Crane of the Crane Plant. The Shewan Plant will henceforth be known as "Crane Plant, 27th Street", and the Crane Plant will be known as "Crane Plant, Erie Basin".

In addition to general steamship repairs, the Crane Plant has long been noted for its work on railroad floating equipment and the Shewan Plant has specialized in both steamship and yacht reconditioning. United Dry Docks operates also the Staten Island Plant at Mariners Harbor, Staten Island; the Fletcher Plant at Hoboken, New Jersey, and the Morse Plant at 56th Street, Brooklyn.

Northwest Yard Busy.— The Prince Rupert Drydock & Shipyard, Prince Rupert, B. C., recently finished a unique job for the Canadian National Railway Company in the form of a steel diesel tug and steel car barge which was fabricated at the Prince Rupert yard, then shipped 1100 miles by railroad to the shores of Okanagan Lake in south central British Columbia and assembled there for launching. The tug and barge will transfer freight cars from Kelowna to Penticton near the southern end of the lake.

The tug has over-all dimensions of 73 by 17 by 7 ft. and is powered with a 300-horsepower Gardner diesel engine and a Gardner unit auxiliary-pumping and generator auxiliaries and power on one base. The main diesel is a heavy-duty, 6-cylinder, medium-speed type. The towing winch is direct-driven off the propeller shaft through a clutch and gearing arrangement. She carries roomy accommodation for both barge and tug crew, with space for 10 men.

The barge is 185 ft. long, 40 ft. in width, and 8 ft. depth with two tracks carrying four cars each. She has a gas-engine driven warping winch. A special railroad wrecking crane was erected to launch the two craft and put the engines aboard. Skilled employees were transferred in special cars from Prince Rupert to finish the job, and temporary ways were built on the lake, with side launching being employed.

This yard finished another car barge last December, having over-all dimensions of 279 by 42 by 12 ft. and equipped with three tracks holding 17 cars, and housing for a crew of six. Two steam capstans and two steam windlasses, supplied with steam from a coal-fired, fire-tube Vulcan Boiler.

This busy yard, one of the most modern on the Pacific Coast, and located near the Alaska boundary, delivered the last of 12 heavy wooden lifeboats for the Canadian National steamship Prince George, now undergoing complete modernization at the plant of Yarrows, Ltd., in Victoria. These lifeboats are 28 by 8.6 by 3.6 ft. and are of heavy fir and cedar construction, equipped with water-tight bulkheads. Delivery of the last two boats was made on the southbound trip of the Prince Rupert February 21.

Delivery of three other craft made during March and April, are a pleasure boat for L. W. Kengin of Prince Rupert, having dimensions of 34 by 8 by 2.9 ft. with a speed of about 10 knots and powered with a 34-horsepower Redwing gas engine, and a wooden sternwheel river snagboat for the Skeena River and other British Columbia harbor work of the Canadian Department of Public Works. She is 100 ft. long, 29 ft. beam and will be powered with engines from her predecessor, the Bobolink, now being dismantled at the same yard. Hull 39 is a rather unique craft of cruiser design for the Anglican Mission, of Northern British Columbia Coast, a sort of floating parsonage for clergymen who must look after their remote and almost inacessible parishes along that wild coastline. She is 47 ft. long, 12 ft. beam, and 8.6 ft. molded depth. A 54-horsepower, high-speed, Gardner diesel with a 2 to 1 reduction gear will give her a speed of about $9\frac{1}{2}$ knots.

Extensive repair work to half a dozen of the Canadian National Steamship fleet and annual repair work on 40 or 50 of the local fishing fleet has kept a force of over 200 skilled workers busy at this plant thioughout the winter.

Canadian National Railway tug No. 5 on Lake Okanogan.

REPAIRS

Moore Yard Gets Contract.—The Moore Dry Dock Co., Oakland, Calif., has been awarded contract for extensive overhauling to the U.S. Army Engineers dredge A. MacKenzie on a low bid of $31,234. The dredge was damaged last December in collision with the steamer Jefferson Myers off the Golden Gate.

Contract for Steamer Repairs Awarded.—The Los Angeles Shipbuilding & Drydock Corp., San Pedro, Calif., has been awarded contract for repairs to the steamer El Capitan, owned and operated by the E. K. Wood Lumber Company of San Francisco. Damage of sixty bottom plates which will need repairing or replacing was caused when the vessel went aground 275 miles south of San Pedro late in March. She was refloated by Merritt, Chapman & Scott Corp.

Bids for the repairs were submitted by Pacific Coast shipyards as follows:

Los Angeles Shipbuilding & Drydock Corp., $54,465 and 24 days; Bethlehem Shipbuilding Corp., $57,168 and 25 days; Moore Dry Dock Co., $58,986 and 26 days; General Engineering & Drydock Co., $59,750 and 26 days.

Lightship Repair Bids.—The Commercial Iron Works, Portland, Oregon, submitted low bid recently for dry-docking and betterments to the Columbia River lightship. The craft is to have a new deck house and new equipment, including new lights and radio apparatus.

Bids submitted were: Commercial Iron Works, $1680 and 15 days; St. Helens Ship Company, $1924 and 16 days; Lake Washington Shipyards, Seattle, $2645 and 30 days.

Large Repair Job to Yarrows.—Repairs to the Canadian National steamship Prince Rupert, which sank while at the dock at Esquimalt while being overhauled, will be performed under contract by Yarrows, Ltd., Esquimalt, B.C., and will cost in the neighborhood of $110,000 and will require about 60 days.

Danish Motorship Repairs to Burrard.—On a low bid of $53,000, contract for repairs to the Danish motorship Guldberg has been awarded to Burrard Drydock Co., Ltd., Vancouver, B. C. The Guldberg went ashore on March 11 on Maude Island and was floated by the Pacific Salvage Company. Repair work will consist of replacing 23 plates, straightening several frames and replacing others.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of April 1, 1931

Pacific Coast

ALBINA ENGINE & MACHINE WORKS, Portland, Oregon

Purchasing Agent: Jno. W. West.

L. P. Hosford, hull 34, tunnel-stern, passenger and freight motorship for Harkins Transportation Co., Portland, Ore.; 160 L.B.P.; 30 beam; 15 mi. speed; Atlas-Imperial diesel eng.; **keel 2/10/31;** launch 5/1/31 est.; deliver 6/1/31 est.

BETHLEHEM SHIPBUILDING CORP., Ltd. Union Plant, San Francisco

Hull 5347, steel barge for Young Bros., Ltd., Honolulu, Hawaii; 175x44x11 ft.; keel 1/2/31; launched 2/20/31; **delivered 3/26/31.**

Hull 5348, same as above; keel 1/12/31; **launch 3/12/31; delivered 3/26/31.**

Mamo, hull 5349, steel tug for Young Bros., Ltd., Honolulu; 129'3" L.O.A.; 28 beam; 15 draft; Fairbanks-Morse 750 I.H.P. diesel engs., launched 2/14/31; **delivered 3/26/31.**

Hull 5350, pineapple barge for Inter-Island Steam Navigation Co., Honolulu; 175 x 44 x 11 ft.; keel 3/2/31; launch 4/21/31 est.; deliver 5/1/31 est.

CRAIG SHIPBUILDING CO., Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30; **launched 4/2/31.**

Not named, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft; two 500 H.P. Winton diesel engs., **keel 3/15/31;** delivery Aug./31 est.

GENERAL ENGINEERING & DRY DOCK CO. Oakland, Calif.

Purchasing Agent: A. Wanner.

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; keel 3/15/31 est.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.

Not named, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas Imperial diesel.

PRINCE RUPERT DRYDOCK & SHIPYARD Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

Aledor, vee-bottom wooden pleasure cruiser for L. W. Kengin, Prince Rupert; 34 L.B.P.; 8 beam; 2'9" depth; 10 knots speed; 34-B.H.P. Redwing eng.; keel 11/1/30; **launched and delivered 3/31/31.**

Bobolink, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink; keel 12/8/30; **launched 4/2/31.**

Northern Cross, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8'6" molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; **keel 2/15/31.**

U. S. NAVY YARD, Bremerton, Wash.

Louisville, light cruiser CL-28 for United States Navy; 10,000 tons displacement; keel July 4/28; launched 9/1/30; **commissioned 1/15/31; completed 3/6/31.**

Astoria, light cruiser CL-34, same as above; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD, Mare Island, Calif.

Chicago, light cruiser CL-29 for United States Navy; 10,000 tons displacement; launched 4/10/30; deliver 3/13/31 est.

C.L. 38, same as above.

Repairs, Pacific Coast

ALBINA ENGINE & MACHINE WORKS, Portland, Ore.

Cleaning and painting bottom; minor repairs: Memnon.

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: ferry City of Sacramento, Morena, m.s. Standard Service, New Zealand, Capella, stmrs. Bolivar, Capt. A. F. Lucas, Ventura, President Adams, F. S. Loop, Sierra, Yellowstone, Golden Harvest, Kekoskee, Tillamook, Watsonville, Oleum, Tejon, Missoula, Admiral Watson, San Pedro, Topila, launches Oakland, Cipango, San Salvador, barges Richlube, Standard No. 95, Shell No. 2, tug W. B. Storey. Warping drum for windlass: stmr. Fredrick Ewing. Retube starboard condenser: stmr. President McKinley. One manganese bronze blade: stmr. Maunawili. Prepare boiler for U.S. Inspectors: stmr. Duchess d'Aosta. Renew fore and aft decks: stmr. San Mateo. Pipe repairs: stmrs. Lebec, J. L. Luckenbach. Repair cover to companionway: m.s. Commissioner. Handle bait tanks: launch Rainbow. Burn out rivets, etc.: stmr. Tejon. Handle turntable and skiff: launch Geneva. Misc. repairs: stmrs. Esparta, President Polk, California, San Mateo, Makura, Suriname, Point Bonita, Virginia, La Perla, San Jose, Trocas, Pacific Spruce.

CHARLESTON DRYDOCK & MACHINERY CO., Charleston, S.C.

Running repairs: stmrs. Tulsa, Shickshinny, Sundance.

CRAIG SHIPBUILDING CO., Long Beach, Calif.

Drydock for new propellers: Richlieu. Drydock, paint, 4 plates from hull damage: Eldorado.

THE MOORE DRY DOCK CO., Oakland, Calif.

Drydock, clean, paint: barge St. Helena (also caulk and repairs to leak), m.s. Modjokerto (also misc. engine and deck repairs), ferry Santa Rosa (also change propellers, overhaul rudder pintles, overhaul sea valves and strainers), Dorothy Wintermote (also change propellers, misc. caulking of shell rivets), Chas. Nelson (also overhaul sea valves, misc. engine and deck repairs), schr. Wm. H. Smith (also install hawse pipe and other misc. repairs), Haviside Barge No. 5, tug Sea Salvor (also drew tail shaft, overhaul sea valves), stmr. Nebraskan (also misc. deck and engine repairs), American Dredging Barge No. 6 (also caulk and weld rivets and seam in shell), Amer. Barge No. 5 (also misc. repairs), yacht Northern Light (change propeller), stmr. West Cactus (also repack stern gland, caulk misc. rivets), barge Evans (also renew sheathing and caulk), Western Pacific Barge No. 3 (also caulk and weld misc. rivets, renew rudder stock), U.S.A.T. U.S. Grant (drew both tail shafts for examination, unship and repair rudder, overhaul sea valves, caulk and weld misc. rivets, and seam in hull, and misc. repairs), schr. Tamalpais (also caulk and blanket off shaft log and undock), stmr. Glymont (also misc. engine and deck depth repairs), stmr. Munleon (also drew tail shaft, install spare, also installed new propeller, misc. shell rivets caulked).

PRINCE RUPERT DRYDOCK & SHIPYARD, Prince Rupert, B.C.

Minor stern repairs: stmr. Prince John. Dock, clean, paint, also 3 wooden houses and one 10,000-gallon steel tank being built and erected on scow. Bilge pump supplied and installed. Docked for examination: 1 fish boat. Misc. hull and engine repairs not requiring docking: 36 fish boats. Dock, clean, paint, carpenter repairs: 1 scow.

TODD DRY DOCKS, INC., Harbor Island, Seattle, Wn.

Misc. repairs and drydocking: stmrs. Admiral Farragut, Admiral Rogers, Admiral Wiley. Drydock, clean, paint: stmrs. Alameda, Mary D. North King. Grounding repairs: stmr. James Griffiths. General repairs: Stmr. Otsego. Drydock, renew lower section stern frame: stmr. San Rafael. Voyage repairs, etc.: President Lincoln, President Jefferson, City of Bremerton, Iroquois.

U. S. NAVY YARD, Bremerton, Wn.

Dock and misc. repairs: Tennessee, Oklahoma, Buchanan, Waters. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar

Ten coal barges for own account, 175x26x11 ft.; 5 delivered July/30.

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **3 keels laid.**

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L B P , 42'4" beam; 15 depth; 1500 cu. yards cap.; **keel 1/1/31;** deliver 3/25/31 est.

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named; 168 L.B P.; 26 beam; 9 draft; twin Winton diesel engs.: 1600 I.H.P.

Trudione, hull 138, steel yacht, owner not named; 190 L O.A 154 L.W L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launch 4/10/31 est.

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen: 146 ft. length; keel 8/1/30; launch 4/15/31 est.; deliver 4/25/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30, launch 6/20/31 est.; deliver 8/10/31 est.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B H.P. Fairbanks-Morse diesel eng.; keel 10/15/30; launch 3/19/31 est.; deliver 4/25/31 est.

Maine, hull 143, sister to above; keel 10/18/30; launch 4/4/31 est , deliver 4/25/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30; launch 4/7/31 est.; deliver 6/2/31 est.

Halonia, hull 145, diesel-elec. yacht for Chas. E. Thorne, Chicago, 140 L.B P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H P. diesel engs.; keel 1/13/31.

Not named, hull 146, twin screw steel yacht, owner not named: 140 L.B P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H P. diesel engs.; keel 3/16/31 est.; deliver 7/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 4/25/31 est ; deliver 11/29/31 est.

Hull 148, same as above; keel 4/25/31 est.; deliver 12/24/31 est.

Hull 149, same as above; keel 4/25/31 est.; deliver 1/18/32 est.

Hull 150, same as above; keel 4/28/31 est.; deliver 2/12/32 est.

Hull 151, same as above; keel 4/28/31 est.; deliver 3/9/32 est.

Hull 152, same as above; keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A ; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo electric propulsion; 10,500 I H P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

One coastwise oil tanker for Standard Transportation Co., New York; 262x45x15 ft., McIntosh & Seymour diesel eng.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Harmony, hull 4280, steel oil tanker for Gulf Refining Co., launch 1/26/31.

Supreme, hull 4281, same as above; **launched 2/12/31.**

Hull 4284, steel barges for Western Maryland Railway Co.

Hull 4285, same as above.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel ferryboat for the Seaboard Air Line; 65 x 22 ft., 120 H P Fairbanks-Morse eng.; **keel 3/7/31;** launch 5/31 est.

One all-welded steel yacht, owner not named; 50 x 13 ft ; diesel eng.; keel 11/30.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2994, 81-foot commuter boat, owner not named; 2 300-H.P. Speedway engines.

Hull 2996, 110-ft. cruiser for A M Dick; 3 300-H P. Speedway diesels.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Danora, hull 145, steel yacht, owner not named; 108 L B P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30; launch 4/15/31 est ; deliver 5/1/31 est.

Rosewill II, hull 146, steel yacht, owner not named; 126 L.B P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D W.T.; 900 I H P diesel eng.; keel 11/15/30; launch 5/1/31 est ; deliver 5/20/31 est.

Ber-clo III, hull 147, steel yacht for A S Close, Toledo; 106 L B P.; 17'6" beam; 6 loaded draft; 14 M.P.H ; 98 D.W.T.; 300 I. H P diesel eng.; keel 11/25/30; launch 4/20/31 est ; deliver 5/10/31 est.

Not named, hull 148, wood yacht, for S. L Avery, Chicago; 91'6" L B P ; 15'9" beam; 4'6" loaded draft; 85 D.W.T.; 24 mi. per hour speed; 1000 I H.P. diesel eng.; **keel 4/1/31;** launch 6/15/31 est.; deliver 7/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hulls 1074-1083 incl , 10 hopper type steel coal barges for stock; **8 delivered.**

Hull 1084, 50-ton whirler derrick boat for Erie Railroad Co.

Hulls 1086-1115 incl., 30 hopper-type steel coal barges for stock; 175x26x11 ft.

Hulls 1116-1117, two barges for U. S. Eng Office, Pittsburgh, Pa ; 100 x 26 x 7'3".

Hull 1118, steel oil barge for Atlantic Refining Co , Philadelphia, Pa.; 192x40x 11'9".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Hull 119, steel harbor barge for Oil Transfer Corp ; 175x36x12'7-1 8", keel 5/19/30, launch 4/2/31 est ; deliver 4/15/31 est.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W R. Grace & Co., subsidiary). 484 L B P ; 72 beam; 26'1" loaded draft, 18 5 knots loaded speed; 7150 D W.T ; 12,600 I H P turbines; 2 boilers.

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co , New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co ; 290 x 43 x 10 ft ; 12 knots loaded speed; 2000 D W T ; twin screw, geared turbined 1600 I H P.; 2 watertube boilers; **keel 3/15/31;** launch 5/1/31 est ; deliver 6/15/31 est.

Hull 277, sister to above, **keel 3/25/31;** launch 5/15/31 est.; deliver 7/1/31 est

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft ; steel deckhouse 205 ft long; keel 2/9/31 **launched 3/21/31;** deliver 4/15/31 est

Huckleberry Finn, hull 1691, river towboat for Inland Waterways Corp , Washington, D C ; 196 ft. L O A ; 42 molded beam; 6 molded depth; 1000 H P. comp. condensing eng.; keel 5/1/31 est

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H Meyer

Harry B Williams, hull 268, steel tug for Great Lakes Dredge & Dock Co ; 115 x 26 x 15 ft ; one Babcock & Wilcox boiler; 850 H P. turbine with reduction gear; keel 1/12/31; **launched 3/21/31;** deliver 5/31 est.

Hull 269, dump scow for Ed. E Gillen Co , Milwaukee; 124 L O A ; 30 beam; 11'6" depth; keel 1/21/31; launch 4/10/31 est

Hull 270, deck scow for U S Engineers, Chicago; 56 x 20 x 4'8"; keel 2/12/31; **launched 3/21/31.**

Hull 271, deck scow for Great Lakes Dredge & Dock Co.; 130 x 40 x 9 ft ; keel 2/25/31; launch and deliver 4/15/31 est.

Hull 272, same as above; **keel 2/27/31.**

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x 26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S. Engineering Office, New Orleans: 65'6"x 17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

Steel freighter for Victor Lynn Transportation Co.; 210 gro. tons; keel 12/30; launch 4/18/31 est

Two barges for E. T. Slider, 120x30x 7'6"; **launched 2/16 and 2/23/31.**

Ten barges for U. S. Engineers, Rock Island, Ill.; 110x24x5 ft.

Five barges for Inland Waterways, Corp..

Washington, D.C.: 230 x 45 x 11 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 240, deck barge for Bedford Nugent Co.: 100x26x6'6"; keel 8/15/30; launched 9/17/30, **deliver 4/1/31.**

Hull 241, same as above; keel 8/28/30; launched 9/26/30; **deliver 4/1/31.**

Hull 242, same as above; keel 8/30/30; launched 10/1/30, **deliver 4/1/31.**

Hull 243, same as above; keel 9/4/30; launched 10/6/30, **deliver 4/1/31.**

Hull 244, deck barge for stock: 100x26x6'6"; keel 10/20/30; launched 12/4/30; **deliver 4/1/31.**

Hull 245, same as above; keel 11/6/30; launched 2/11/31, **deliver 4/1/31.**

Hull 246, same as above; keel 11/13/30; launched 2/26/31; **deliver 4/1/31.**

Hull 247, same as above; keel 11/16/30; **4/1/31.**

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; launch and deliver 7/1/31 est.

Hull 249, same as above; **keel 1/17/31.**

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; **keel 3/12/31;** launch 5/15/31 est.

Not named, hull 253, steamboat hull for Woods Lumber Co.; 110 L.B.P.; 26 beam; 4'8" depth; keel 4/6/31 est.; launch and deliver 5/2/31 est.

Hull 254, derrick hull for Woods Lumber Co.; 82 x 28 x 4 ft.; keel 4/13/31 est.; launch and deliver 5/9/31 est.

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 4/20/31 est.; launch and deliver 5/16/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 233 Broadway, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 7/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; **launched 3/7/31;** deliver 5/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 8/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; **keel 3/9/31;** launch 8/31 est.; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 5/31 est.; launch 12/31 est.; deliver 7/32 est

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; deliver 5/32 est.

Not named, hull 351, sister to above; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Exeter, hull 396, passenger and cargo steamers for Export Steamship Corp., New York: 450x61'6"x42'3"; keel 8/11/30; launch 4/4/31 est.

Excambion, hull 397, sister to above; keel 10/25/30; launch 5/16/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; **10,000 tons** displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; **keel 1/20/31.**

Not named, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; **launched 3/14/31;** complete 5/1/31 est.

Locust Point, hull 1049, two steel, single-screw, harbor tugs for stock; 92 L.B.P.; 23 beam; 12'6" loaded draft; steam eng. 1 Scotch boiler; keel 12/2/30; launched 2/17/31; **delivered 3/27/31.**

Ch. Speddon, hull 1050, same as above; keel 12/2/30; launched 3/2/31; **delivered 3/30/31.**

Richmond, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; keel 2/12/31; launch 5/1/31 est.; deliver 6/17/31.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Gilbert, hull 269, steel hull diesel tug for Atlantic, Gulf & Pacific Co., New York; 57 L.B.P.; 14 beam; 5'6" loaded draft; 120 H.P. Fairbanks-Morse diesel eng.; **delivered 4/7/31.**

Not named, hull 270, diesel tug for Atlantic, Gulf & Pacific Co., New York; 35 L.B.P.; 11'7" beam; 4'1" loaded draft; 75 B.H.P. Fairbanks-Morse diesel eng.; **keel 4/1/31;** launch 5/1/31 est.; deliver 5/15/31 est.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Southern Sun, hull 132, single-screw, diesel tanker for Motor Tankship Corp.: 13,400 D.W.T.; keel 8/21/30; **launched 3/21/31; delivered 4/2/31.**

Not named, hull 133, sister to above; keel 9/17/30; launch 6/13/31 est.; deliver 7/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 137, single screw diesel oil tanker for Standard Transp. Co.; **480 x 65'9" x 37'**; Sun-Doxford diesel eng.; keel 11/13/30; launch 5/16/31 est.; deliver 6/1/31 est.

Hull 138, diesel-electric barge for Atlantic Refining Co.: 190x34x12 ft.; keel 2/9/31 launch 6/1/31 est., deliver 6/15/31 est.

Hull 139, steel oil-tank towing barge for Standard Transp. Co.; 225 x 38 x 10 ft.; keel 4/10/31 est.

Hull 140, sister to above; keel 4/10/31 est

Hulls 141-145 incl., five small barges for Sun Oil Co.; 70 x 19 ft.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Not named, hull 50, steam ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan./31.

Not named, hull 51, sister to above; keel Jan./31.

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel Jan./31.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric; 3200 I.H.P.; 2 W.T. boilers; **keel 2/9/31;** launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; **keel 2/9/31;** launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30; **delivered 3/25/31.**

Vesta, hull 89, sister to above; keel 10/9/30; **launched 3/27/31;** deliver 4/5/31 est.

Shipyards Corporation Executives Promoted.—At a recent meeting of the Board of Directors of Todd Shipyards Corporation, three executives of subsidiary companies were appointed vice-presidents of the parent corporation, effective April 1. The executives appointed in recognition of their long and efficient services are: J. Herbert Todd, president of the Todd Dry Dock, Engineering and Repair Corporation, Brooklyn, George Dawe, president of Robins Dry Dock and Repair Company, Brooklyn, and George G. Raymond, president of Tietjen and Lang Dry Dock Company, Hoboken. John D. Reilly, Assistant to President William H. Todd since the inception of the Todd Shipyards Corporation in June, 1916, was also appointed a vice-president.

Marine Insurance

Edited by James A. Quinby

God Save the Mark

Not the German Mark—The Trade Mark

I happened to be doing my loafing in the office of Bruce Jordan, the marine loss man for the Excelsior Underwriters, when in walked Murphy, claims agent of the Pink Funnel Line, and Lathrop, traffic manager of Carter & Howell, the big tobacco people. You may not know Carter and Howell, but you certainly know their cigarettes. You'd have to be blind to miss their glaring "Toasted, Tested, and Tasted" spread in red and green over every bill board in the country.

It seems that a goodly shipment of the wellknown smokes had been damaged by seawater on board one of the Pink Funnel boats. Lathrop wanted the shipment destroyed, but Bruce and Murphy had other ideas. I saw that there might be a battle, and started to leave, but Bruce dragged in another chair and insisted that I stay.

"We can't seem to get together on this," said he. "You don't know anything about it, so maybe you can be a sort of ex-officio arbitrator. We carry an open policy for Carter & Howell. It's a darn good account. Lathrop, here, isn't the type to pester his insurers with ten-cent claims, and we get along fine. Lately, however, this trade mark business has come up two or three times, and it always results in a big argument. This case is a typical example.

"Some three hundred cases of cigarettes came in on the Nigelia, damaged by sea-water in various degrees. Murphy, here, claims the damage was due to heavy weather. Funny thing for Murphy to say, isn't it? Ha, and again Haha! Of course, we say the damage was caused by unseaworthiness of the vessel, and all that sort of thing. At any rate, we're clearly liable to Carter & Howell under our policy, and, if the goods are a total loss, there'd be no argument at all. We'd pay the face value of the declaration, take a loan receipt, and start after the ship.

"But the goods aren't a total loss. Our surveyor, Rudy Johnson, says they can be sold as they now stand for a sizeable sum. He's even got one or two very fair bids for them. Murphy and I are in favor of selling the goods, and thus establishing the amount of liability under the policy and, incidentally, the amount of the ship's liability, if any is proved."

"That," broke in Murphy, "is, of course, without prejudice to any defenses which the ship may have under the bill of lading or otherwise."

"Oh, sure," the underwriter chuckled, "You've got that memorized pretty well, haven't you? Well, to get down to brass tacks, we've insured the goods against damage by seawater and we're ready to pay the loss, but we want credit for the actual salvage value as it now stands."

"But wait a minute," said Lathrop, "Didn't you just say the ship was liable for this? What do you care how much you pay me if you can turn around and recover it from the Pink Funnel?"

"That's just the point," countered Jordan, leaning forward over his desk. "We can't be sure of recovering from the ship. I'll submit the case to my attorney for an opinion, and he'll write me about twenty pages, which, in Market Street English will mean 'Maybe you can and then again maybe not.' But assume that we do recover from the ship. The measure of their liability will be the invoice value of the goods, less what we could have sold them for in their damaged condition. If we throw away goods that have some intrinsic value, no court in the land is going to make Murphy pay us for them."

"That's right," said Murphy, smugly, "But all of this discussion is, of course, entirely without prejudice to . . . . ."

"Oh sure," said Jordan, impatiently waving him aside. "But don't you see, Lathrop, we insured the physical damage to your goods. Nothing was said in the policy about protecting your trade-mark. If you want to take our check for the actual damage, you are certainly welcome to take the cigarettes and dump 'em in the bay, but why should we be the goats? We don't make money on your advertising campaign."

"No?" queried Lathrop reflectively. "I'm not so sure of that. If the billboards and the radio hadn't blared our brands at the buying public for the past twenty years, would our account have been built up into one of the best in your office? The trade name on our products is worth as much as the goods themselves. Maybe more. I'm not hiding the fact. Lots of cigarettes are as good as ours, but who smokes 'em? The American public buys through its eyes and ears, and pays through the nose. The tongue doesn't get into the picture.

"Of course our product is a good one—an excellent one. But we've spent a lot of money making people believe in it. If we allow these damaged goods to be

Morituri te Salutamus

We are the damned and halting hosts
  Of ships that should be dead.
Anachronistic living ghosts
  On seas that our mates have fled.
Sisters and kin of the South Coast,
  The Brooklyn's brothers in blood.
Stretching our travail the longer to boast
  That we stand where the dead have stood.
We laugh at the Sea Foam's tardy fate,
  But our laugh has a hollow tone
And spewing our oakum north of the Gate
  We think of the old Cleone.
If decades of courage can merit our right
  In peace and quiet to die,
Why must we lurch through the wintry night?
  Why? Why? Why?

—J.A.Q.

thrown on the market they'll get into the hands of the cut-rate dealers. People will buy 'em cheap, and then criticize the brand when the goods are found to be extra-dry, or mildewed, or the wrapping soiled or torn."

Murphy suggested that the goods might be re-wrapped.

"All that would do," snapped Lathrop, "would be to add an additional item of expense to the deal. You could do that with canned goods,and then sell'em without labels, or with a fake label. But each and every one of our cigarettes has our brand printed on it. We can't afford to have that brand prostituted. Your company has built up a reputation for square dealing, Jordan. Would you like some second-rate outfit issuing policies with your name on them? Or you, Murphy, would you want some fly-by-night coasting vessel selling Pink Funnel service? No, the goods will have to be destroyed, and the policy will have to cover the loss. It's a real loss to us, and it's caused by a sea peril. There are other underwriters who will be glad to pay it if we give them our business."

"When you make that argument," said Jordan quietly, "you admit the weakness of your case. No, Lathrop, we didn't get a premium for insuring your trade-mark, we didn't agree to turn over all salvage to you for disposition, and we can't pay you more than the actual loss. To knuckle under to you now would make every loss in the future a total loss."

Murphy turned to me. "Well" he said "what do you think?"

* * * *

Frankly, I don't know. I understand they straightened out their difference in this instance by getting Lathrop to accept the best of the goods, and splitting the total loss of the remainder three ways, each of them standing a third. But the problem remains for the next case. . . . . What do you think?

Salvage and Language

THE recent opinion of Judge Neterer of the United States District Court in Seattle (M. H. Curry, et al, and Georgia Company v. the steamship Kekoskee) is more than an interesting decision in a dramatic salvage case—it is living proof that judicial language need not be technical and dry—that the days of Story and Taney have not passed entirely into the limbo of forgotten things—in short, that a Daniel (Webster) has come to judgment.

The case itself arose from a fire on Pier 40 in Seattle on February 3, 1930. The Kekoskee, a tanker, was fast in the dock discharging gasoline and fuel oil from her cargo tanks to shore tanks when the fire was discovered. She was also discharging fuel oil to the U. S. Coast & Geodetic Survey steamer Surveyor. The wooden tug Georgia was at its berth at the shore dock between Piers 40 and 41.

The fire on the dock immediately got out of control and shot flames over and in close proximity to the Kekoskee to such an extent that the railing and masts of the tanker either caught fire or were scorched. The crew of the tanker, with the exception of four men, immediately went elsewhere. The Surveyor also departed hence, not even stopping to disengage her fuel line. The Georgia left her berth, made fast to the stern of the Kekoskee, and towed the tanker out into the harbor, where the flames on the woodwork and awnings were soon extinguished.

The court points out that the services rendered by the Georgia and her crew were prompt, skillful, and of a high order, and proceeds to award the tug and her crew a total salvage of $11,000, divided $4750 to the Georgia and $6250 to the crew. This unusual division is based upon the degree of risk voluntarily undertaken by the crew members.

It is in discussing this element of risk that the Court rises to unusual heights of descriptive expression:

"If an oil tank had exploded," runs the opinion, "the Kekoskee and many lives, no doubt, would have been destroyed, especially those on board the tanker as well as the dock, and the crew on the tug would have been very seriously burned, if not killed. Shakespeare in 'Macbeth' said, 'Life is but a walking shadow;' and Carlyle, 'a thawing iceberg on a sea with sunny shore.' It has been likened to changing and shifting ocean tides that ebb from shore to shore. Roswell D. Hitchcock said it is 'But the immediate breath we draw,' and we are ever reminded that 'sorrow lends but weak relief to him that bears affliction's cross.' And Bacon said, 'O, Life! an age to the miserable, a moment to the happy.'

"It is obvious that the value of the five men and the risk to incapacity for life and welfare was much greater than the value of the tug or danger to its damage or destruction. The Court in The Llewelyn J. Morse, 30 Fed. (2) 402, at 406, awarded a seaman a total recovery of $28,541 for injury. This has not been modified by any court. This was not a salvage case, but is referred to only to show the value of unimpaired life. Of course the tug is inanimate, and the seamen, animate, and with Fielding in "Tom Thumb," Act 3, Part 1, we may say, 'When I am not thanked at all I am thanked enough. I've done my duty and I've done no more;' and with George Eliot, 'Not liberty, but duty is the condition of existence,' or 'The reward of one duty is the power to fulfill another;' or, with Hazlitt, 'the last pleasure of life is the sense of discharging our duty;' or, with La Bruyere, 'They do well, or do their duty who with alacrity do what they ought;' or, with Webster, in the Knap murder trial, 1830, 'A sense of duty pursues us ever. It is omnipresent like the Deity.'

"The purpose of salvage is compensatory, to inspire the saving of property and inspire the assumption of risk perhaps beyond the duty of life; and this service must be voluntary, and the reward must be sufficiently large to inspire salvors to take the required risks."

"Washed Overboard"

THERE has recently been brought to our attention (Fairplay, March 12, 1931) a case in which a foreign court appears to have attained the ultimate in the way of plain and fancy injustice.

It seems that the good ship Capri carried a cargo of corkboard from Lisbon to Genoa, on deck at shipper's risk, as duly provided in the bill of lading. The vessel met with heavy weather during the voyage, and twenty-three bundles of the cork were washed overboard. The captain made the usual entry in his log and noted his protest upon arrival at Genoa.

The protest was drawn in Italian, and the interpreter, possibly due to his lack of familiarity with the verb, used for "wash" an Italian word meaning "to cleanse with water." The Tribunal before whom suit was brought for the damage solemnly held that the ship had been guilty of washing the cargo during the voyage, and must account for the loss of the twenty-three parcels.

The case was of course appealed, and the Court of Appeal confirmed the judgment, even after the log had been introduced with an entry reading "Having shipped heavy sea, some cork bales stowed on deck were washed overboard." This entry was explained by the ingenious assumption that the word "overboard" was added subsequently at a time when the master realized the full enormity of his offense in swabbing down the cargo.

Not content with the mere decision, the Tribunal added insult to injury in computing the damages The invoice value of the corkwood was about L2.0.0. per bundle, but the bill of lading disclaimed liability for any sum exceeding L10.0.0 per package, so the trial court gave judgment for £230.-for the loss of cargo worth about £46.-and the Court of Appeal dismissed the appeal and fined the shipowner 100 lire for having made it.

Cargo Damage in Germany

WE note from Lloyd's List of March 4 the report of an interesting cargo damage case recently decided by the German courts.

It seems that a shipment of 6854 bales of tobacco outturned damaged from a steamer, due to stowage in a hold from which the taint of coal-tar, received on a prior voyage, had not been fully removed. The Hamburg Landesgericht (whatever that is) decided that the ship was unseaworthy and accordingly liable. To our way of thinking, accustomed as we are to the Harter Act and the duty of proper stowage and fitness for cargo imposed on carriers in this country, the decision was correct. But the Oberlandesgericht (which, we gather, is the appellate court) did not agree with the lower court's decision and reversed the case.

The reversal was based upon a consideration of a clause in the charter party whereby it was provided that the ship and her owners should not be liable for the negligence of the officers or crew. The following reasoning, used by the appellate court to sustain the reversal, seems to be based on the theory that "the poor feller done his best."

"The responsibility of the owners for mistakes committed by the captain in the treatment and stowing of the cargo had also been explicitly ruled out in the charter-party by a negligence clause. If the owners now appealed to this clause, the Court could see in their appeal no breach of good manners, for the captain could not be regarded as having anything to do with the management of the firm, nor could his error be regarded as showing marked culpability. It must be remembered, too, that the captain previous to taking the tobacco on board had had the hold thoroughly swabbed out, freshly caulked and aired for three weeks. If these measures had proved insufficient, the captain, in the opinion of experts, could hardly be held very much to blame. This being so, there was no reason for regarding either the owners or the charterers as responsible in the case."

The clause avoiding liability for improper stowage or unseaworthiness would not be valid in the United States.

Fixtures, Charters, Sales

April 16, 1931

THE following steamers have been fixed with grain to U.K./Continent: British str. Janeta, Vancouver, B. C., to Antwerp and Rotterdam, Apr., Canadian American Shipping Co.; British str. Mabriton, Vancouver, B. C., to U. K./Con., Mar., Dale & Co. Ltd.; British str. Troutpool (or substitute) Vancouver, B. C., to U. K./Cont., 22/6, Apr., Canadian Cooperative Wheat Producers Assn.; British str. Cape Cornwall, British Columbia to London and Middlesborough, May, Canadian American Shipping Co.; British str. Haxby, Vancouver, B. C., to U. K./Cont., 22/6, Apr., Canadian Cooperative Wheat Producers Assn.; British str. Cragpool, Vancouver, B. C., to U. K./Cont., 22/6, May, Canadian Cooperative Wheat Producers Assn.; a steamer Vancouver, B. C., to London, 21/3, Apr.; British str. Peterton, Vancouver, B. C., to U.K./Cont., Dale & Co.; British str. Langleeford, Vancouver, B. C., to Antwerp and Rotterdam, 20/9, May, Earle & Stoddart; British str. Brighton, Vancouver, B. C., to U.K./Cont., Apr., Dale & Co.; British str. Frumenton, Vancouver, B. C., to London, Dale & Co.; British str. Goolistan, Vancouver, B. C., to Antwerp, Apr., Dale & Co.; British str. Koranton, Vancouver, B. C., to London. Apr., Dale & Co.; British str. Madras City, Vancouver, B. C., to Antwerp, Rotterdam 21/-, option London, Hamburg 21/6, Hull 21/9, Mitchell Grain Co.

The following vessels have been fixed with lumber to the Orient: British m.s. Cape Horn, British Columbia to Japan, Apr., Canadian American Shipping Co.; British str. Chief Capilano, British Columbia to Japan, 7, Mar. Apr., H. R. MacMillan Export Co.; Danish m.s. Peru, Grays Harbor to Shanghai, 7.25, May, Grays Harbor Exportation Co.; Japanese str. Yojin Maru, British Columbia to 3 ports Japan, 7.50, May, H. R. MacMillan Export Co.; Norwegian m.s. Bonneville, Coos Bay and Columbia River to Yokohama and Osaka, May, rechartered by Canadian American Shipping Co.; Danish m.s. Tongking, Puget Sound and Grays Harbor to Shanghai, 7.25, May, Grays Harbor Exportation Co.; Japanese m.s. Fukko Maru, Columbia River to Japan, Apr. Mitsui & Co.; Japanese str. Taigen Maru, Columbia River to Japan, Apr., Nakata & Co.; British m.s. Alynbank, Grays Harbor to Yokohama and Osaka, May, Canadian American Shipping Co.; Norwegian m.s. Slemmestad, British Columbia to Yokohama, Apr., Canadian American Shipping Co.; Japanese str. Kohwa Maru, Columbia River to 3 ports Japan, May, M. Nakata & Co.; Japanese str. Ayaha Maru, Columbia River to Japan, May, Douglas Fir Exploitation & Export Co.

The American str. Missoula has been fixed with lumber from Columbia River and Puget Sound to Guaymas and Mazatlan, prompt, by Hammond Lumber Co.

The British str. Bencleuch has been fixed with lumber from British Columbia, Grays Harbor, and Columbia River to Antwerp, Rotterdam, and Leith, Apr., by Canadian American Shipping Co.

The following steamers have been fixed with lumber to the Atlantic: American m.s. Silveroak, Puget Sound to New York, Hirsch Lumber Co.; American str. Lake Ormoc, Columbia River to North of Hatteras, May, Henry D. Davis Lumber Co.; American str. Lake Benbow North Pacific to North of Hatteras, 8, May, Kraus Brothers Lumber Co.

The following time charters have been reported: Norwegian m.s. Nyhaug, delivery North of Hatteras, redelivery U.K. via North Pacific, Apr., Canadian Transport Co.; Norwegian m.s. Toronto, delivery Newport News, redelivery U.K./Cont., Bordeaux Range via North Pacific, Mar., Canadian Transport Co.; Norwegian m.s. Bonneville, delivery North Hatteras, redelivery worldwide, 4 to 7 months, 1, Apr., Strange & Co.; Norwegian m.s. Danwood 2 years, delivery Colon, 1.05, June, J. J. Moore & Co.; Norwegian motorships Brand and Borgestad, 1 year, (continuations) J. J. Moore & Co.; Norwegian m.s. Brynje, 4 to 7 months, delivery and redelivery U.K./Cont., Apr./May, Canadian American Shipping Co.; British m.s. East Lynn, delivery San Pedro, redelivery China and Japan, 1.65, H. R. MacMillan Export Co.; British m.s. Elmbank, delivery North Pacific redelivery China and Japan, 1.65 Strange & Co.

The following sales have been reported: American str. Vanguard Captain Barker to Chas. H. Higgins; American str. Carmel, Grays Harbor, and Raymond, Sudden & Christenson to T. P. Whitelaw, (to be dismantled); American str. Tamalpais, Hammond Lumber Co. to A. C. Porter (to be dismantled); American Schooners Commerce and Samar, Henry Kirchmann Co. to Oakland Barge and Towboat Co.

PAGE BROTHERS, Brokers

Trade Notes

Cutless Rubber Bearings on River Motorship.—The interesting new tunnel-stern, passenger and freight motor vessel for operation on the Columbia River by the Harkins Transportation Company is now nearing launching date at the Albina Engine & Machine Works, Portland, Oregon. The vessel is to be known as L. S. Hosford and was described in the April issue of Pacific Marine Review. Among her interesting items of equipment will be Goodrich Cutless Rubber Bearings installed on her $8\frac{1}{2}$-inch diameter propeller shafts.

Goodrich Cutless Rubber Bearings have also been specified for the new police boat for the City of Boston, which is being built by the George Lawley and Sons Corporation, Neponset, Mass. The propeller shaft is to be $9\frac{1}{2}$ inches diameter.

Larger Quarters Acquired.—The Lincoln Electric Compny, Cleveland, Ohio, manufacturer of Stable-Arc welders and Linc-Weld motors announces the removal of its Chicago office to a new building at 1455 West 37th Street, from 53 West Jackson Blvd. This move is made to provide additional space for the sales and service of Lincoln Stable-Arc welders, Linc-Weld motors and to provide additional storage space for a complete stock of welders, welding supplies, and accessories.

Extension of Busch-Sulzer Works.—The Board of Directors of Busch-Sulzer Bros.-Diesel Engine Co. has authorized the construction of a new erecting shop, suitable for testing diesel engines of large sizes up to 25,000 horsepower per engine, and an extension of the iron foundry with a 75-ton craneway. W. J. Knight & Company, Engineers, have been retained to draw plans and supervise the work.

The trend toward larger sizes is indicated by recent orders for seven Busch-Sulzer diesels all larger than 1000 horsepower including one 4000-horsepower engine for the Tuscon plant of the Federal Light and Traction Co., one 3000-horsepower engine for the Public Service Co. of Colorado, a Cities Service Utility, and one 3000-horsepower engine for Freeport, New York. Several sales negotiations in hand include large diesels of from 4000 to 8000 horsepower for public utilities.

Dieselization of American transportation air, highway, rail, river, and ocean will be one of the "new industries" contributing to the revival of business during the next major prosperity era, with substantial replacement of inefficient steam locomotives and obsolete slow-speed steam passenger and cargo vessels, according to Edward B. Pollister, president.

New Agency for Marine Engines.—Thomas D. Andrews, for fifteen years specializing in the construction, installation, and maintenance of marine diesel engines from Glasgow to Rangoon and way points, is

Thomas D. Andrews.

now located in San Francisco, having recently opened offices at 16 California Street as Pacific Coast representative for several of the best known American and British gasoline and diesel motors, comprising a complete line of internal combustion engines for marine use. Included in the list are: Scripps marine motors, sales and service; Speedway marine engines; the Glennifer diesel; and the complete line of the Parsons Oil Engine Company.

It is the intention of Mr. Andrews to maintain a complete service for workboat operators, including expert installation and testing service, full stock of spare parts, and sound engineering advice.

Packing Company Acquires Additional Properties. — The France Packing Company of Tacony, Philadelphia, manufacturer of metallic packing for all conditions of service, has purchased the business of the Martell Packings Company of Elyria, Ohio, and all records, drawings, and everything pertaining to Martell's packing business has been transferred to Tacony. A. H. Krugman, who has been connected with Martell for the past twenty years, is now in the employ of the France Packing Company.

Preformed Wire Rope Progress.—The American Chain Company, Inc., has announced that one of its subsidiaries, the American Cable Company, has concluded negotiations with the American Steel and Wire Company, a subsidiary of United States Steel Corporation, to manufacture preformed wire rope under a license agreement, the patents covering this material being owned by the American Cable Company.

In addition the company has concluded license contracts for the manufacture of this material with the General Cable Company; five leading rope manufacturers in Canada; British Ropes, Ltd. and its various subsidiaries, the largest manufacturers of wire rope in the United Kingdom, together with four other companies in Great Britain; Australian Wire Rope Works, Ltd.; and Felton & Guilleaume, the largest producers of these products in Germany and Continental Europe. Negotiations are also pending for similar contracts with other wire rope manufacturers.

Preformed wire rope is said to be the first basic improvement in wire rope construction in over eighty years. In its manufacture, the wires and strands are preformed and preshaped to the exact helical "lay" which they assume in the finished rope. The result is freedom from internal torsional stress. This factor, it is claimed, substantially increases the length of services.

Honolulu Fuel Oil Station for Sale.—The Shipping Board on April 6 authorized the Merchant Fleet Corporation to sell the Board's fuel oil station in Honolulu. The station, which is located on land leased from the Oahu Railway, consists of two 55,000-barrel steel storage tanks and two steam pumps. It was first put into operation in July, 1930. The station is still in use, but the reduction of the Shipping Board operations in the Pacific has practically eliminated the Board's need for continuation of operation.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

W. H. Hoskier, who heads the newly reorganized Panama-Pacific Line activities on the Pacific Coast.

The establishment of operating offices on the Pacific Coast, with headquarters at San Francisco, has been announced by A. J. McCARTHY, general manager of the Panama Pacific Line and of the International Mercantile Marine Company of New York. The Pacfic Coast manager will be W. H. HOSKIER.

G. F. RAVENAL has been on the Coast for several weeks as representative of the company to perfect the plans and obtain berthing space and office facilities. The operating and cargo departments for the Panama Pacific Line have been handled by the Pacific Steamship Company; and this agreement comes to a close June 1, at which time the new operating machinery will be in good working order.

Mr. Hoskier has been traffic manager of the Line at New York for the past six years. He joined the I.M.M. company in 1919 as assistant to A. J. McCarthy, manager, later becoming assistant manager of the company. His work at New York will be absorbed by E. H. COOKE, formerly assistant passenger traffic manager, who has been appointed assistant general manager of the I.M.M. Co.

Mr. Ravenal has announced the appointment of R. J. RINGWOOD as Pacific Coast freight traffic manager for the line. Ringwood as freight traffic manager for the Pacific Steamship Company has been handling the Panama-Pacific freight business on the Pacific Coast for many years. He is a very popular and able shipping executive and has been identified with Coast shipping since 1898.

KENKICHI KAGAMI, president of the Nippon Yusen Kaisha, Ltd., was the guest of honor at a luncheon at the Palace Hotel, San Francisco, April 22, immediately on his arrival from Japan aboard the N.Y.K. Line's flagship Asama Maru. The luncheon was attended by the leading shipping and commercial leaders of the port. Mr. Kagami heads a delegation of Japan's leading industrial executives to the International Chamber of Commerce conference at Washington. Others of the delegation are YUKINORI HOSHINO, president of the Kajima Trust Company, and KUNIZO HARA, president of the Aikoku Life Insurance Company.

William Groundwater, newly appointed Director of Transportation of the Union Oil Company of California. "Bill" Groundwater has been with the Union Oil Company for twenty years and is a leading figure in the shipping business of his home port—Los Angeles Harbor—as well as a person of importance in all ports served by his company's oil tank ships.

Edward P. Green, son of George C. Green, San Francisco manager for Fairbanks, Morse & Co., went out on the tug Mamo, when she sailed on her maiden voyage from San Francisco to Honolulu, as assistant engineer. Young Green graduated from the University of California in 1928 and entered the diesel department of Fairbanks-Morse at Beloit.

The Annual Steamship Golf Tournament of San Francisco will be held this year on Tuesday, May 26, at the Menlo Country Club and committees have been appointed to make this The Best Yet! According to present plans the players will adjourn to the Family Club Farm following the tournament for a dinner, at which prizes will be awarded flight winners.

Roger D. Lapham, president of the American-Hawaiian Steamship Company and golf expert of national prominence, is honorary chairman of the tournament. Hugh Gallagher, operating manager of the Matson Navigation Company, is chairman.

Course and entertainment committee: William J. Edwards, Pacific Coast manager, Norton, Lilly & Co.; Hugh Gallagher; A. S. Gunn, General Manager of Bethlehem Shipbuilding Corp., Ltd., Union Plant.

Official News *of the* PROPELLER CLUB *of* California

Captain Stanley "Capstan" Allen, our energetic secretary-treasurer, kindly prepared for us the following roster of thirteen new members. Here they are!

C. C. Mallory,
E. A. Williams,
L. E. Pringle,
Harvey Huff,
T. D. Andrews,
Captain Fred Lemon,
Captain J. D. Guthrie,
Glen Hoffman,
Captain John B. Blain,
Louis Levin,
John H. Thies,
Captain I. B. Smith,
Fred Dorward,

—PC—

The Propeller Club is enjoying weekly luncheon meetings at the San Francisco Commercial Club, held on Tuesdays, where a special effort is made to have an interesting speaker or program of entertainment for the members.

On March 31—the Propellers were addressed by Captain C. W. Fisher, U. S. N., on the subject of "Deep Sea Diving." Captain Fisher has had many years of experience in this branch of the work of the Navy Department, with particular reference to salvaging of submarines which met with accidents and settled to the ocean bottom. He is at present manager of the Mare Island Navy Yard; and his talk will long be remembered by his interested listeners.

Propeller Banquet

Thirteenth of May, 7 p.m., that's the date and time of the Second Annual Spring Banquet of the four hundred and thirty-four all active members of the Propeller Club of California. We will assemble for banquet feasting and extravaganza entertainment at the spacious banquet hall of the San Francisco Commercial Club. The versatile and talented Propeller Entertainment Committee is now rehearsing an elaborate show for the edification of the Propellers and their friends.

On April 7, through the courtesy of the Transcontinental & Western Air Line, Inc., a very interesting motion picture was shown of a voyage from Winslow, Arizona, to California, and showing the view from the plane crossing the mountains and desert.

On April 14 the Panama Mail Steamship Company presented a very interesting motion picture illustrating a voyage of one of its passenger liners from San Francisco to New York via the Panama Canal, with stops at ports of Central and South America and Havana. The film showed the mode of landing passengers and freight at out-ports and some of the inland trips available to passengers.

On April 21 a surprise program furnished a means of the members becoming better acquainted. Each member was given a ticket prior to the luncheon and, after luncheon was served, the corresponding numbers were placed in a box and certain ones withdrawn. The holder of each number withdrawn was then obliged to present himself and give the club a brief outline of his connections in the marine activities of the port.

—PC—

James Rolph, Jr. (at left) governor of California, and Richard R. "Dick" Loynes, of Long Beach, vice-president of the American Power Boat Association, as they were seen at the Third Annual Pacific Coast Boat Show, San Francisco, last March. Gov. Rolph is seen seated in Loynes' Gold Cup winning speedboat.

ROY T. CROWDER, one of the best known and most popular executive passenger agents on the Pacific Coast has left the Los Angeles Steamship Company to go to New York to become passenger traffic manager of the Panama Mail Steamship Company, with headquarters in New York, effective July 1.

Mr. Crowder was passenger traffic manager of the Los Angeles Steamship Company for eleven years, and prior to that had extensive experience in railroad travel business. In 1910 he became general agent of the Western Pacific and Denver & Rio Grande Railroad at San Francisco; leaving this position to go with the Toyo Kisen Kaisha in 1918 as general passenger agent. Backed by the extensive experience in both railroad and steamship travel Roy Crowder is generally credited with being responsible for the successful development of the coastwise and Hawaiian passenger services of the Los Angeles Steamship Company. His appointment to the Panama Mail Steamship Company was announced by C. C. MALLORY, manager.

Roy T. Crowder who goes to New York for the Panama Mail Line and carries with him the experience of many years of successful tourist work on the Pacific Coast.

R. STANLEY DOLLAR, vice-president and general manager of the Dollar Steamship Lines, has announced the appointment of the two men who are to command the new liners President Hoover and President Coolidge now nearing completion at Newport News.

CAPTAIN FRED E. ANDERSON, now commander of the round-the-world liner President Wilson, has been honored by his company by the appointment of master of the President Hoover, which goes into service next August as the largest liner ever to be built in an American shipyard.

To CAPTAIN K. A. AHLIN, now master of the transpacific liner President Taft, goes the honor of appointment as master of the President Coolidge, sister ship to the President Hoover, which will go into service in October.

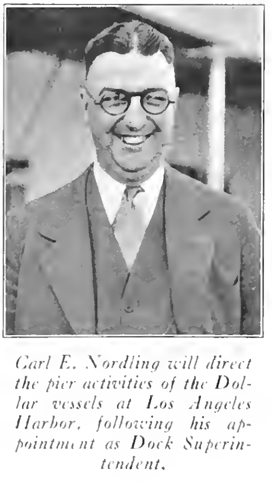
Captain Anderson has been in the service of the Dollar Line for many years and has served as master of several vessels since 1930 and has traveled about a million miles under the Dollar house flag. He is a resident of Oakland, California, and he is one of the most popular and efficient navigators operating out of San Francisco.

Captain Ahlin has also been in the service of the Dollar line for a number of years and was the master of the first passenger liner to operate on a scheduled round-the-world service when he took out the President Harrison from San Francisco westbound in 1924. Several years later he was transferred to the President Taft, his present command. His home is in Berkeley.

Recently deserting his post of dean of marine bachelors of the Pacific merchant marine, WALTER LASCHELT, senior purser of The Admiral Line in point of service, went to Los Angeles and there married Miss Ethel Neiman.

Laschelt, who joined the Pacific Steamship Company in 1917, has served on virtually every vessel of the Admiral Line's large coastal fleet. At the present time he is purser of the Dorothy Alexander. The couple spent their honeymoon at Santa Barbara, but Laschelt returned to his ship at San Francisco on April 24.

The "Dorothy" is scheduled to make two Mexican excursions from San Pedro before entering the summer tourist trade to Alaska, where she has obtained fame as a cruise ship.



Carl E. Nordling will direct the pier activities of the Dollar vessels at Los Angeles Harbor, following his appointment as Dock Superintendent.

C. E. NORDLING, who has been dock agent at San Francisco for the Dollar Steamship Lines since 1920, has been transferred to Los Angeles harbor to the position of terminal superintendent, to succeed GEORGE C. BANKSON, resigned. Mr. Nordling has been active in San Francisco shipping for twenty years. He was with the old Pacific Mail Steamship Co. from 1910 to 1914; from 1914 to 1915 with the Luckenbach Line; from 1915 until the entry of the United States into the World War with the Panama Pacific Line; while during the war he served in the Navy, both on this coast and with the Atlantic fleet destroyer squadrons.

Mr. Bankson has resigned from the Dollar company to enter another phase of the shipping industry, it was announced.

The last voyage of the freighter Golden Harvest, of the O. & O. Line, from Australia to San Francisco was a lively one, according to H. J. DECKER, combination freight clerk and radio man. "We have no passengers to liven up the ship, but on this last trip the Golden Harvest was a veritable floating zoo, with an assortment of kangaroos, parrakeets, bookabuttas, rufous fantails, and many other birds and animals." All of which kept the crew busy and amused. The boistrous laugh of the bookabuttas (native to Australia and known as "laughing jackasses") is very disconcerting at times, according to members of the crew, "particularly when you have slipped on deck or bumped your head on a beam."

HENRY VORTMAN, chief engineer of the tanker Deroche, was tendered a luncheon aboard his ship on April 2 at San Pedro in celebration of completion of 25 years in the service of the Union Oil Company of California. He was presented a pin set with rubies, the badge of twenty-five years' service.

From private correspondence it is learned that CAPTAIN FRED C. DUNCAN passed away at his home in Princeton, Illinois, on March 28, 1931, at the age of 84 years.

Captain Duncan was well known in connection with his command the ship Florence of which he was master for fourteen years. Surviving him are his wife, three sons and two daughters. The captain was accompanied on most of his voyages by his family; and his children were raised in the cabin of the Florence, two sons having been on board the ship when she was in port at San Francisco. All were reared so carefully that on taking up shore life in later years it was found that the time they had spent at sea was no handicap.

Captain Duncan was a native of Bath and for many years sailed for Charles Davenport, a prominent shipowner of that city. He made his first voyage as a boy in the ship St. Helena in 1859; and at the age of 17 was a third mate. He then entered the United States Navy as Acting Master's Mate, being the youngest commissioned officer in the service. He was on the Brooklyn in the Battle of Mobile Bay and was mentioned for gallantry in action.

After the close of the Civil War he joined the new ship Kate Davenport and was in her as mate and master for seven years. He was then a deputy Shipping Commissioner at New York, serving under his father, Captain C. C. Duncan; but the call of the sea was too great to be resisted and he took command of the Florence. He retired from sea life when she was sold on the Pacific Coast.

James H. Wilcox, new Pacific Coast Manager for Sharples Specialty Company.

Captain Robert (Bob) Purdy (left), veteran skipper for Young Brothers' towboat and launch fleet at Honolulu, and John A. (Jack) Young, manager of the Young Brothers, Ltd. They are congratulating each other on the fine performance of the new tug Mamo.

WEAVER L. MARSTON, for some time manager of the Pacific Coast branches of the Sharples Specialty Company, last month was promoted to the position of sales manager of the entire Sharples organization and is now located at the main office at Philadelphia. Prior to coming to the Pacific Coast, Marston was assistant sales manager at the Philadelphia headquarters. He joined the company in 1926.

JAMES H. WILCOX, who joined the firm in 1924 and who has been manager of the Sharples branch in Los Angeles for the past five years, has been appointed general manager of the Pacific Coast branches.

THOMAS J. GRIFFIN, formerly assistant manager of the Pittsburgh branch, becomes manager of the Los Angeles branch. The Sharples Specialty Company manufactures centrifugal oil purifiers.

CAPTAIN R. H. JOHNSON, who has been head of the operating department of the Luckenbach Steamship Company in Seattle for the last three years and was formerly commander of the Walter A. Luckenbach, sailed for Balboa, March 20, to become a government pilot at the Panama Canal.

Captain Johnson has been succeeded at Seattle by JOHN J. COUGHLIN, a veteran Pacific Coast steamship man, going to Seattle from the San Francisco operating department. Mr. Coughlin has been in the service of the Luckenbach company at different Pacific Coast ports for many years and also served at one time in Seattle in the traffic department of the old Pacific Coast Steamship Company. He was at one time in charge of the Nome, Alaska, dock for the Alaska Lighterage and Commercial Company.

Suffering from a fracture of the skull and a broken nose WILLIAM RAMSAY, assistant electrician of the Panama Pacific liner Pennsylvania, was taken ashore at San Pedro on a recent voyage. The injuries were caused when Ramsay plunged 28 feet down one of the vessel's elevator shafts. He was taken to Mercy Hospital and is now on the road to recovery.

W. L. Marston, who leaves his post as Pacific Coast Manager of Sharples Specialty Company to become sales manager at the Philadelphia headquarters.

Prominent Shipping Executives on Merchant Marine Committee

On Monday, April 20, J. C. ROHLFS, manager, Marine Dept., Standard Oil Company (Calif.) and president of the Pacific American Steamship Association, left San Francisco to attend the meeting of the standing committee appointed by T. V. O'CONNOR, chairman of the United States Shipping Board, to study ways and means of putting into effect the resolutions adopted by the Fourth National Merchant Marine Conference held at Washington on January 21 and 22, 1931. This committee owes its origin to the following resolution adopted unanimously at the close of the conference.

"Resolved, That to carry into effect the various actions taken by the conference, the chairman is authorized to appoint a standing committee, not less than five in number, to review the papers which have been read at this meeting, and whose further duty shall be to take such initial steps as may be necessary to carry into effect the various resolutions adopted, to decide upon the merit of the recommendations contained in the various addresses delivered at this conference, and to follow up those that are deemed meritorious and report the progress at the next annual conference."

Chairman O'Connor, after considerable study and effort, secured for this important committee the following key men representing all the great shipping regions and the various shipping interests of the United States:

ERNEST L. JANCKE, assistant secretary of the Navy; H. B. WALKER, president, American Steamship Owner's Association; J. C. ROHLFS, president, Pacific American Steamship Association; JOSEPH T. LYKES, president, Lykes Brothers, Inc.; ROBERT C. TUTTLE, manager, Marine Department, Atlantic Refining Company; COLONEL BARBER, United States Chamber of Commerce; and T. V. O'CONNOR as ex-officio chairman.

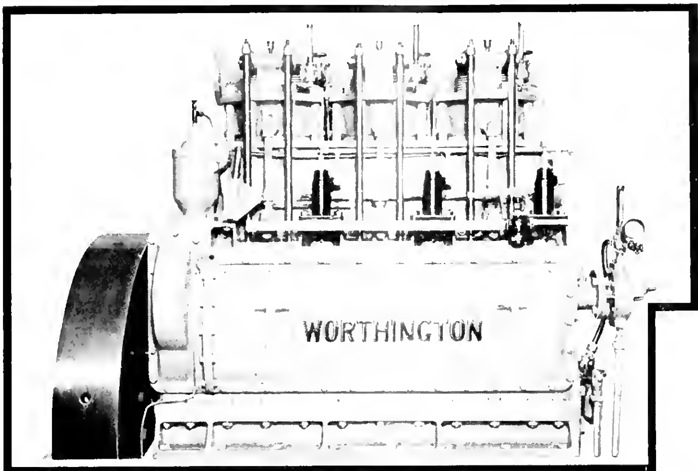
Included in the program of this committee are studies and research covering: The strengthening of the Merchant Marine Act of 1928; the promotion of greater patronage for the American merchant marine; the training of American young men for merchant marine officers; devising some equitable form of national aid to cargo vessels; reduction of marine insurance costs; reduction of differential in shipbuilding costs between America and Europe; modernization of American merchant vessels; study and research in marine engineering developments; safety for marine workers; study of load line developments; and study of maritime legislative needs. A broad, comprehensive program for a strong and able committee.

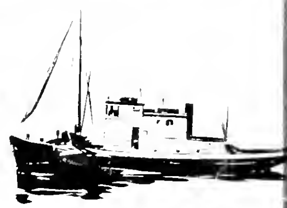
After the meeting at Washington on April 24 to 26, the members of the committee attended the April 28 to May 1 meeting of the United States Chamber of Commerce at Atlantic City and the May 4 to 9 meeting of the International Chamber of Commerce at Washington. At both of these meetings the committee members will stress the merchant marine message and it is hoped that their contacts will "sell" the American merchant marine idea to the delegates at these important meetings so that all over the United States key men with leadership in their respective communities will be lined up solidly to strengthen the Merchant Marine Act of 1928 and urge further favorable legislation.

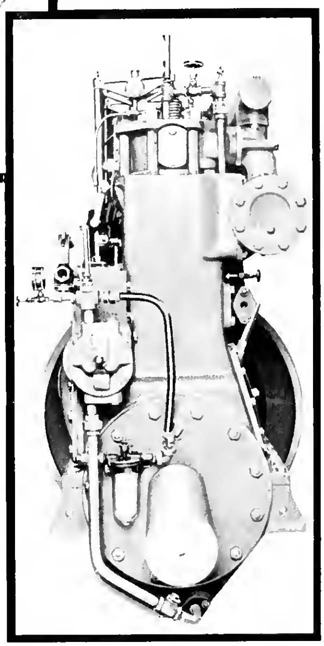
PACIFIC AMERICAN STEAMSHIPS FOR PACIFIC COAST SHIPPERS

Pacific Marine Review

JUNE 1931







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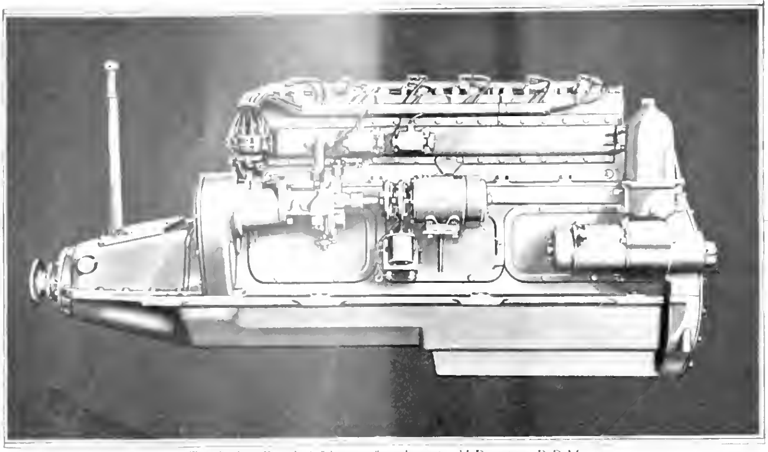

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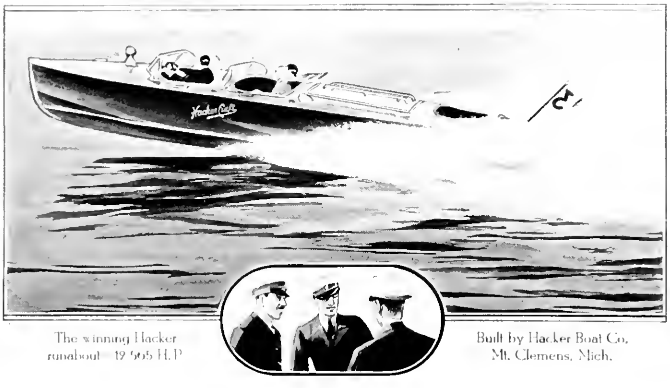

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Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | JUNE, 1931 | NUMBER 6

Contents

Official Organ Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

500 Sansome Street, San Francisco

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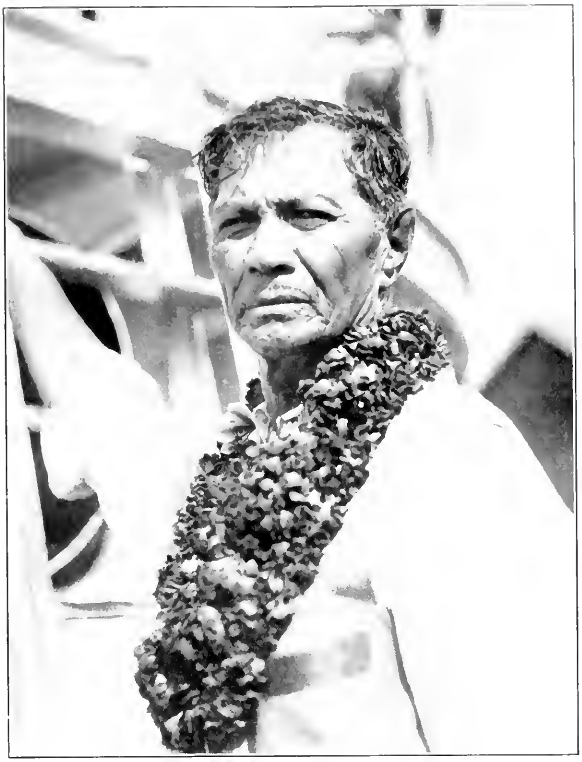


(Photo by Bert G. Covell, Honolulu)

A MARINE CHARACTER STUDY

The subject of this study, Captain William R. (Bob) Purdy, is dean of the towboat skippers of Young Brothers deepsea towing fleet operating out of Honolulu to all ports in the Hawaiian Islands. As a deepsea towing expert, it would be hard to find his equal. He has justly earned the title "Mamo" among Hawaiian tug men

Pacific Marine Review

VOLUME XXVIII JUNE, 1931 NUMBER 6

Editorial Comment » » »

Pacific Coast Shipbuilding

IN an address at the annual meeting of the National Council of American Shipbuilders, held in New York, April 16, 1931, H. Gerrish Smith, the president of that Council, called attention to the revival of shipbuilding as indicated by the fact that for the first time since the close of the Shipping Board shipbuilding program, the larger American shipyards are able to operate continuously.

Notwithstanding this fact, the total available shipbuilding capacity in the United States today is being used to less than 50 per cent. capacity. Pacific Coast shipyards are practically idle; but Mr. Smith, as reported in current press, thinks that these yards should be encouraged by the fact that more than a half of the value in new construction in Atlantic Coast yards is represented by vessels that will have their home ports on the Pacific Coast and that these vessels will require an annual expenditure for docking, painting, surveys, overhauls, and other work—the inference being that since such work is usually done in a home port the Pacific Coast yards will reap a harvest later.

There is, of course, little if any consolation for the Pacific Coast shipbuilder in this possible future reward thrown out as a sop to divert attention from the present lack of new construction. It must be admitted that if ships for West Coast owners were being built in West Coast yards, then these yards would be in an even better position both to secure and to perform future maintenance work on these ships than is the case under present conditions. The Atlantic Coast yards are building good ships and the Pacific Coast yards are certainly not going to reap any great profits in the near future on repair and maintenance accounts for these vessels.

There are, however, some straws of evidence now in view indicating that one or two sizeable shipbuilding jobs are coming to Pacific Coast yards and some signs of activity in the yards toward getting ready for these jobs.

Shipbuilding under competitive bidding is by no means a bed of roses. Among the world's industries, it is perhaps the most difficult in which to make a reasonable profit, and that mainly for the reason that so large a proportion of the cost of a ship goes to labor. For this reason it is the industry most worthy of public promotion and it receives public recognition and assistance in practically every maritime nation.

This may be illustrated by history of the old Union Iron Works, founded in San Francisco as the first steel shipbuilding yard on the Pacific Coast in 1881. In consideration of this plant and of the public policy of maintaining ship repair and ship building facilities on the Pacific so far from basic materials supply, the United States Congress granted a 4 per cent. differential to Pacific Coast yards in bidding for naval vessels. The new construction work obtained by virtue of this differential enabled the Union Iron Works to maintain a fine organization, ready for any emergency repairs, for the building of several commercial vessels, and for a fair volume of general engineering work. This plant produced some of the most noted vessels of the United States Navy. It kept for fifteen years an average force of 3600 men profitably employed, and distributed during that period over $47,000,000 in wages. In other words, it was the direct support of 15,000 population. It operated on a capitalization of $1,000,000 and used most of the profits to build up the plant, which was sold on appraisal value at $3,500,000 in 1903. During the 22 years corporate existence of this plant a little over $1,000,000 was distributed in dividends.

It seems to us that these figures show very eloquently the rather close margin on which the shipbuilding industry operates, from the standpoint of the investor, and at the same time its value as a community asset.

For these reasons the San Francisco Bay Region and other Pacific Coast communities should use every possible influence to bring shipbuilding contracts to Pacific Coast shipyards.

Cruiser San Francisco

ANNOUNCEMENT that the new light cruiser now being laid down at the Mare Island Navy Yard is to be named San Francisco has called forth much favorable comment from Californians and has brought out among old timers many reminders of the building of the light cruiser San Francisco, launched at the old Union Iron Works in 1889.

This vessel was the second cruiser built at the plant, and her success on government trials established the Union Iron Works as worthy builders of United States naval craft. Their first job, the cruiser Charleston, was a success, but the critics of the Atlantic seaboard were still very much opposed to spending government money so far away from "home." However, when the San Francisco showed a speed of $19\frac{3}{4}$ knots on her sea trials and came back through the Golden Gate with a broom at her masthead it was admitted by all concerned that the steel shipbuilders and the marine engineers of San Francisco were equal to the best and that the 4 per cent. differential for naval building on the Pacific Coast had been justified.

The old cruiser San Francisco was first commissioned November 15, 1890, and was placed out of commission December 24, 1921. During the World War she was fitted up as a second line mine layer and was so classified when decommissioned. She saw active service in the Spanish War as a cruiser. She was 324 feet 6 inches in length over-all, 49 feet 2 inches beam, 18 feet 9 inches mean draft, and had a full load displacement of 4583 tons. Her main propulsion plant consisted of two horizontal triple expansion engines, 42 by 60 by 94-inch cylinders and 36-inch stroke, each of which was directly connected to a propeller shaft. The total indicated horsepower was 9761. Steam was generated by eight Babcock & Wilcox water-tube boilers.

This fine old veteran of two wars carried a fore and aft suit of sails on three masts, and when spread to the wind was a very neat, trim, shipshape craft.

Many graduates of the apprentice system of the Old Union Iron Works are now working in the various departments of Mare Island Navy Yard, either as mechanics or in executive positions. It would be very interesting to know just how many men who helped build the former San Francisco will be working on the new cruiser.

The new cruiser San Francisco will bear almost as little resemblance to the old ship as the modern skyline of San Francisco bears to the pictures of that city in 1890. The U.S.S. San Francisco will be almost an exact replica of the U.S.S. Chicago recently completed at Mare Island and now on her shakedown cruise in the South Pacific. She will be a fast, rakish craft of 10,000 tons displacement, fitted with every effective modern device for navigation, maneuvering, and accuracy of gunfire. From the naval architectural, marine engineering, and shipbuilding viewpoints she will be a notable product of the California navy yard and well worthy to bear the beautiful name of San Francisco.

Wind Power on Shipboard

TIME was when America led the world in the application of wind power to the propulsion of vessels at sea, when our white winged argosies were welcome in every port of the world. After the Civil War, however, we soon found that the exertion of wind power in politics and business economies was a far more profitable application, and so we forgot our heritage of Tyre and forsook the sea until we were brought back to it by a world war.

Wind power is now only a memory in so far as it conserves the propulsion of vessels for commercial sea travel. Flettner sought to revive wind power with his rotors, but though that "magnus effect" is theoretically a wonderful auxiliary power, yet its practical difficulties more than offset its theoretical advantage. The Flettner rotor, however, has had a very practical stepchild in the S rotor of Dr. Savonius, a Finnish physicist. This is being successfully and extensively used as a wind motor or a tide or current motor for many purposes.

From a marine standpoint its most interesting application is in driving exhaust ventilating fans. The S rotor works on a vertical shaft and is driven by wind coming from any direction. Built with a centrifugal exhaust turbine type blower runner attached to its lower end plate, it is a very efficient and compact low pressure air pump. This rotor and fan can be placed on top of a ventilating duct and occupy little, if any, more space than the standard wind cowl. The combination produces a powerful suction and, in conjunction with suitable ducts for fresh air inlet, makes a very valuable ventilating device.

In Europe, both afloat and ashore, this S rotor ventilator is finding much application. It is manufactured in a very wide range of sizes and capacities ranging in application from the bilges of small motorboats to the holds of large cargo liners.

Twenty-Five Years Ago

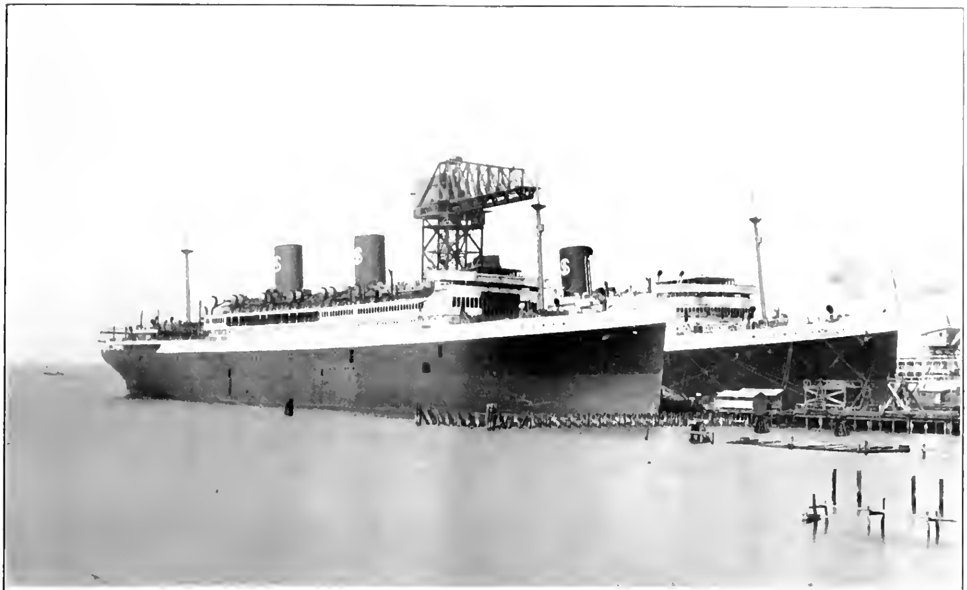
PACIFIC MARINE REVIEW of June 1906 carried as a leading article an illustrated description of a new fireboat patented by Lewis Nixon and named the Nixon Standard. Under the influence of the widespread alarm resulting from the recent great San Francisco fire, Tacoma had decided to build a public fireboat. Nixon sent his chief engineer, A. C. Page, to sell his Nixon Standard to Tacoma. This boat design had a steel torpedo type hull, with overhung stern. She was to be 51 feet length over-all, 45 feet 6 inches between perpendiculars, 12 feet molded beam, and 5 feet draft. Power was to be supplied by a 6-cylinder Standard, heavy duty, gasoline engine driving a single-screw through clutch connection and being direct-connected at its forward end to a rotary pump with a capacity of 2000 gallons per minute against 150 pounds pressure.

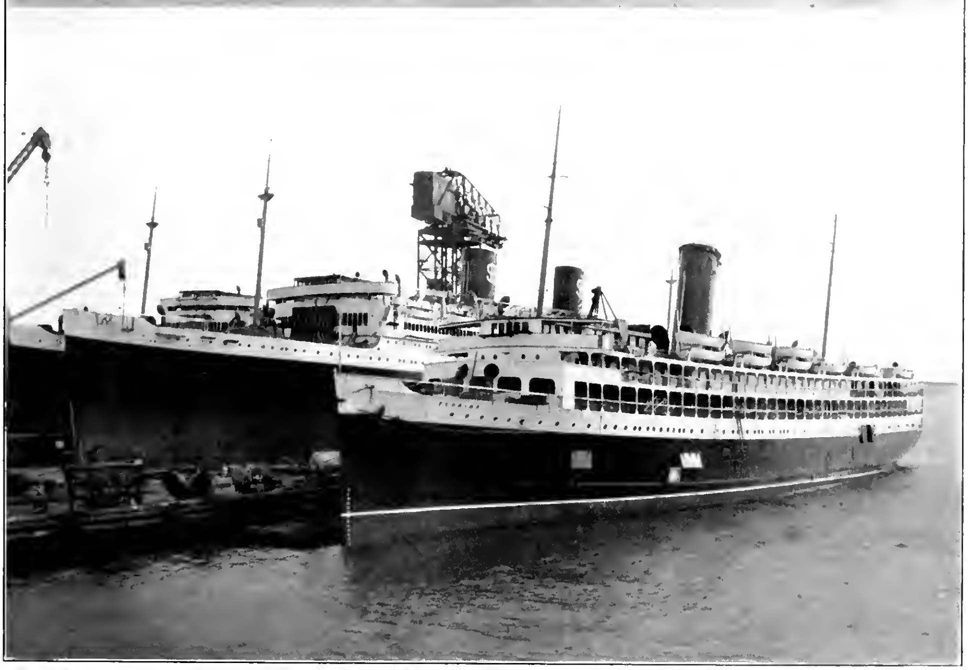
A circular deck erection at the center of this craft carried a monitor nozzle and eight universal hose couplings. This boat was to be built in quantity and was priced at $30,000 delivered ready to fight fires.

Tacoma decided to build the then conventional steam fireboat and no Nixon Standard fireboats were built, so far as our records show. The idea, however, was sound; and when Tacoma some twenty-one years later decided to build another fireboat, gasoline engine drive for boat and pumps had become practically standard equipment for this type of craft.

Another item of June 1906 indicates that the "boarding house masters and crimps" were fairly powerful in those days. A crimp who came aboard a vessel in the open roadstead at Port Townsend and tried to persuade the crew to desert was killed by the mate. Our editor advised the judge to find that this killing was justifiable under the old admiralty rule "repelling of boarders."

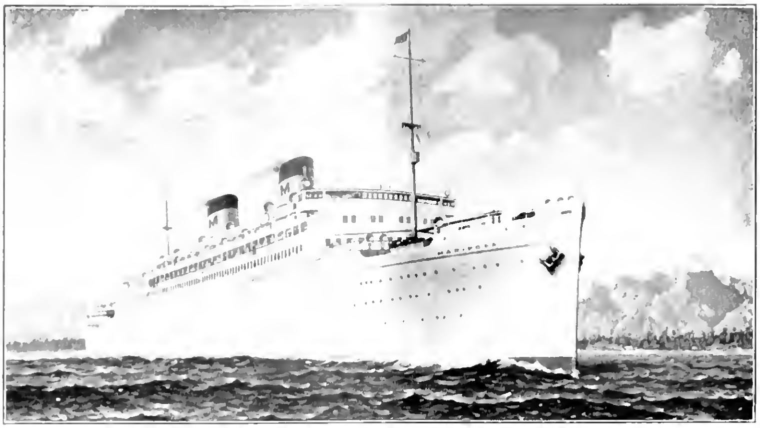
Dollar Pacific Liners Nearing Completion





Top: The two new transpacific liners President Hoover and President Coolidge of the Dollar Steamship Company nearing completion at the outfitting dock of the Newport News Shipbuilding & Dry Dock Company. The President Hoover will have her trials early in June and will leave New York on her maiden voyage August 6. The President Coolidge will be delivered during October.

Bottom: A view of the same ships from the opposite side showing also the Steamship Florida, new passenger steamer for the Peninsula & Occidental Steamship Company, which was delivered during May.



Artist's conception of the new South Seas liner Mariposa.

Progress on South Seas Liners

First of the Matson-Oceanic Steamers Building at the Fore River Plant, Bethlehem Shipbuilding Corporation, to be Launched July 18

HERALDING a new era of fast luxurious transportation over the romantic South Sea travel lane between California and Australia, the steamship Mariposa, first of a trio of modern superliners now building for the Matson Navigation Company of San Francisco, will be launched July 18 at the Fore River plant of the Bethlehem Shipbuilding Corporation, Quincy, Massachusetts.

Mrs. Wallace M. Alexander, whose husband is vice-president of the Matson Line, chairman of the board of Alexander & Baldwin, Ltd., and one of the best known shipping executives in the Pacific area, will act as sponsor for the new ship. Water from the picturesque land-locked harbor at Sydney, Australia, will be used in the christening ceremony.

Several months later, probably in November of this year, the steamship Monterey, a sister ship, will be launched. Plans for the second launching have not yet been worked out. As soon as the Mariposa is off the ways in July, work will commence on a third Matson liner, Lurline, which will be a sister ship of the other two.

Under present plans, the two first ships will go into service over the historic Australia-South Seas route next year, Mariposa in February and Monterey shortly following. Lurline will not be available before 1933.

This trio of new ships represents an investment of approximately \$25,000,000, each unit costing \$8,500,000. When completed, they will stand unsurpassed in the first rank of the world's finest ocean carriers. Mariposa and Monterey are being equipped specially for service in the tropics and will combine the latest scientific devices that make for cool and comfortable transportation. The two ships to be launched this year will be named in compliment to two of California's most famous counties. Mariposa County was the locale of the historic gold rush in '49, being the heart of the rich Mother Lode district. Monterey, claiming California's first state capital, is reminiscent of the days when gallant Spanish grandees ruled the land.

With construction being carried on under the provisions of the Jones-White Act of 1928, all three vessels will be built to the rules and regulations of the American Bureau of Shipping and the United States Steamboat Inspection Service, and, for water-tight subdivision, they will conform to the regulations of the International Conference on Safety of Life at Sea.

General Particulars

The general particulars are as follows: length over-all, 632 feet; length between perpendiculars, 605 feet; beam, 79 feet; draft, 28 feet; displacement, 26,000 tons; guaranteed trial trip speed, $20\frac{1}{2}$ knots. There will be nine decks, 16 water-tight compartments, and double bottom throughout. The bulkheading arrangement is such that with any two of the largest adjacent compartments of the vessel flooded the ship would remain afloat.

Capacity

Each of the new liners will accommodate approximately 750 passengers, 500 first class and 250 cabin class. By using the same quality stateroom equipment in the cabin as intended for the first class, certain passageway doors may be opened to make the vessel all first class.

The cargo space will accommodate 5000 tons of dry cargo and 850 tons refrigerated cargo in six chambers. Special compartments have been arranged for mail and express, and a specie room for bullion. Fuel oil tanks have a capacity of 40,000 barrels, and fresh water tanks of 2800 tons.

Machinery

The vessels will be propelled by twin screws, and the main propelling machinery will consist of three turbines and a set of single reduction gears on each shaft. The normal shaft horsepower is 22,000 with a maximum of 25,000. Steam will be supplied by 12 water-tube boilers. All of the auxiliary machinery will be electrically operated, the current supplied by four 500 kilowatt generating sets.

Accommodations

First class public spaces have been arranged on "A" deck, with a library, writing room, lounge, theatre, smoking room with men's club and card room adjacent. On this deck also will be an exceptionally large ball room veranda extending the width of the ship and entirely closed in with adjustable low type glass windows. On the dome over the social hall there is a new feature in a game deck which provides a tennis court, hand ball court, and space for other sports. The new liners will provide more promenade deck space per passenger than any other American-built ship. Enclosed with adjustable glass windows, the spacious promenades become available to passengers in any sort of weather. Each ship will have two outdoor swimming pools, built into the vessel, a delightful innovation for travel in the tropics. Convenient to the swimming pools will be dressing rooms, gymnasiums, and electric cabinet baths.

One large galley is provided between two spacious dining salons which will accommodate practically the ship's entire passenger list at one time. The modern galley will be the last word in scientific culinary equipment, with electric ranges, electric grill, and electric bakery.

Ventilation for the entire ship will be provided by the Thermotank system, arranged for circulation of either natural or heated air. Forced ventilation will change the air in enclosed spaces every three to five minutes. The sides of the vessel will be protected against outside heat by cork insulation.

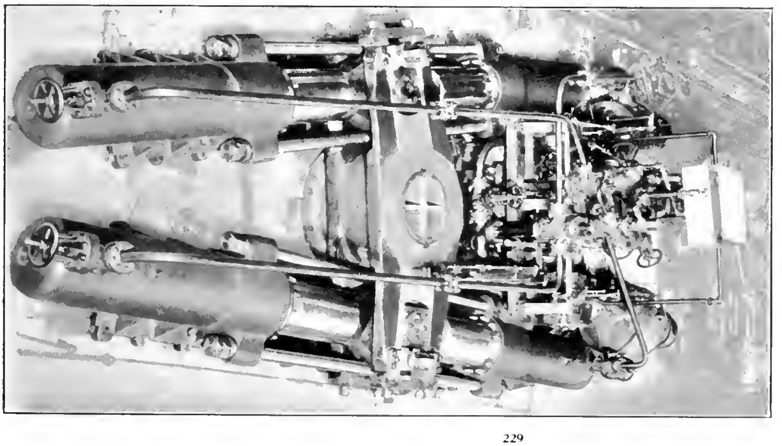
Staterooms are unusually large and, with the exception of a few maids' rooms at the center of the ship, all are arranged as outside staterooms. Every first class room on the ship has either a private bath, private shower, or connecting bath. Each bath has hot and cold fresh water. All staterooms will be fitted with extra large twin beds, and furnishings to match will be on a par with the finest hotel or club. There are numerous de luxe staterooms with large private verandas. Two special de luxe stateroom suites on "C" deck consist of two double bedrooms, living room, maid's room, dressing room, and trunk room.

A complete telephone system will be installed throughout the ship, each and every room, cabin and first class, being provided with a private telephone.

The new Matson liners, in short, will be veritable floating cities in which the wizardry of modern marine engineering will have installed every comfort and convenience to be found on shore. On each liner there will be a complete newspaper plant, printing last minute news and stock reports flashed from world centers by radio; a theatre in which the latest talkie releases will be shown; and a complete broadcasting system bringing into private staterooms available shore programs and such ship programs as are put on in the various public rooms. Smart shops, beauty parlors, a fully equipped laundry, children's playrooms, novelty shops, barber and tailor shops, photographic studio, a night club, a brokerage office, and skilled medical, dental, and nursing services are some of the other features of these distinctive sea-going palaces.

It is significant that these gigantic new American flag vessels, like many others now building or contracted for, are for service in the Pacific. Recent years have seen the development of new world currents in foreign trade and travel, indicating that the "Pacific Era" is at hand. In American shipyards alone, upwards of $60,000,000 worth of new tonnage is now building for this trade. The Mariposa and Monterey, inaugurating fast passenger and express service between the vigorous young continents of Australia and America, will serve one of the most picturesque and potentially lucrative sections of the new world. Enroute to and from Australia these new white Goliaths of the Pacific will call at Honolulu, Hawaii; Pago Pago, American Samoa; and Suva, Fiji. Steaming through the heart of the romantic South Seas, about which so much has been written and filmed, these speedy de luxe liners will open new vistas for jaded world travelers and thrill seekers.

Incidentally, the Londoner who must keep a business appointment in Sydney will find he can do it days quicker, and with greater comfort and variety of scenery, via America and one of the new Matson liners from San Francisco or Los Angeles.



The massive steering gear of the Mariposa is unique in its arrangement. The four hydraulic cylinders are arranged in the form of a Vee, about 30 feet long and 11 feet wide at its forward end. Motors, pumps, and controls are installed in the forward end of the Vee, making a compact arrangement. This electro-hydraulic gear is by the American Engineering Company.

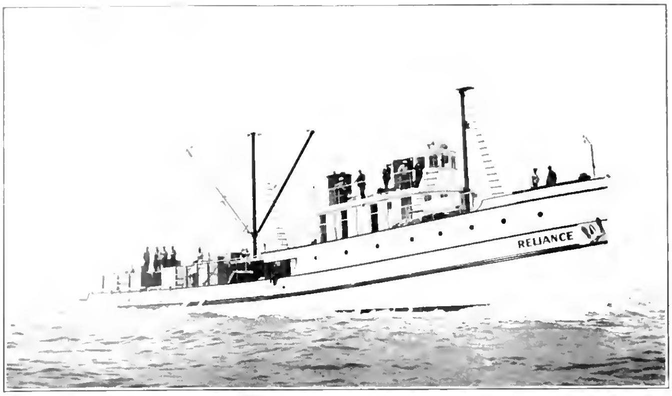
A California Tuna Fisher

Recently Completed, the Large Fishing Boat Reliance Uses Alternating Current Exclusively for All Electric Drive on Auxiliaries

THE large tuna fishing boat Reliance, recently completed at the Al Larson boatyard, San Pedro, California, for Paul Verney, George Stakelin, Earl Howard, and associates, is unique in at least two features of her design.

First, her machinery arrangement and her piping layout were definitely planned by expert marine engineers simultaneously with the laying out of the hull lines by her builders.

Second, she is claimed to be the first fishing boat to have all auxiliary machinery operated by alternating current motors.



Quartering view of the new tuna fishing boat Reliance making 10½ knots on her trials off San Pedro.

To Fairbanks, Morse & Co. goes the credit for both these unusual features. Robert Woodworth was the Fairbanks-Morse engineer in charge of the machinery layout, and the installation was performed by the expert crew of the Fairbanks-Morse repair shop at San Pedro, with H. Stagg in charge. All electric wiring, switch board, and fixtures were installed by Ets-Hokin and Galvan of San Francisco and Wilmington.

The Reliance has the following general characteristics:

Length over-all	126.0 feet
Length between perpendiculars	116.7 feet
Beam molded	27.2 feet
Depth, under deck at side to top of keel	10.5 feet
Gross tonnage	313
Net tonnage	208
Crew (including wireless operator)	14
Mean draft	11'6"
Shaft horsepower	450
Speed, knots	10½
Fuel capacity, gallons,	20,000
Cruising radius, miles,	8,000

This vessel is sturdily built of Oregon pine with heavy frame and planking, as will be seen in the half inboard profile herewith, She has a raised deck forward in way of the deck house and engine room, and this, with her deck house, provides ample sleeping accommodations for fourteen men, two in a cabin with room for two additional in case of necessity. The machinery is located well forward, giving a clear deck aft for fishing and for bait tanks and fish holds.

Machinery

The propulsion unit of the Reliance is a 5-cylinder, 14- x 17-inch, Model 37, pump scavenge type, Fairbanks-Morse, 2-cycle diesel engine delivering 450 shaft horsepower at 260 revolutions a minute and driving an 80-inch diameter, 55½-inch pitch, 3-bladed, solid bronze propeller of Lambie design. This engine has the new style open-head system of combustion. The Brown Instrument Company of Philadelphia supplied the exhaust pyrometers with indicator mounted on the operating panel of this engine.

Auxiliary power is provided by two 4-cylinder, 6- x 6½-inch, Fairbanks-Morse diesels rated 54 shaft horsepower at 720 revolutions per minute and each direct-connected to a 35-kilowatt generator and its exciter, delivering 3-phase, 60-cycle, alternating current at 220 volts. The alternators and exciters were supplied by the Electric Machinery Mfg. Co. of Minneapolis. These generating sets are located port and starboard of the main engine on the working platform of the engine room.

Clean lubricating oil for both auxiliary generating sets and the main engine is assured by the installation of a Sharples lubricating oil centrifuge.

All of the auxiliary machinery on the vessel is driven by Fairbanks-Morse induction motors. This type of electric motor is standard for many industrial applications. It is low in first cost, economical in operation, easy of maintenance, and permits the use of simple, "fool proof" control.

One of the most unusual and interesting features of this boat is the arrangement of the bait pumps. These are located in a narrow thwartship compartment at the after end of the deck house. They are vertical shaft turbine type pumps, the motors being mounted on top, so that they have practically the same appearance as the typical deep well irrigation pump head, the resemblence being heightened by the vertical 10-inch casing suction and the 8-inch casing discharge. The arrangement of pumps, motors, and casing is clearly shown on the plan and the inboard profile and

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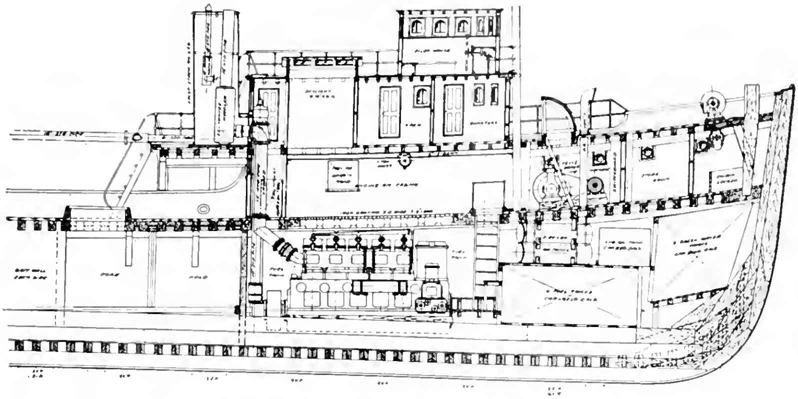
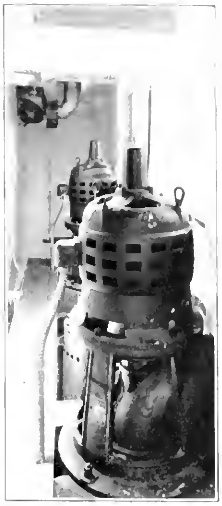
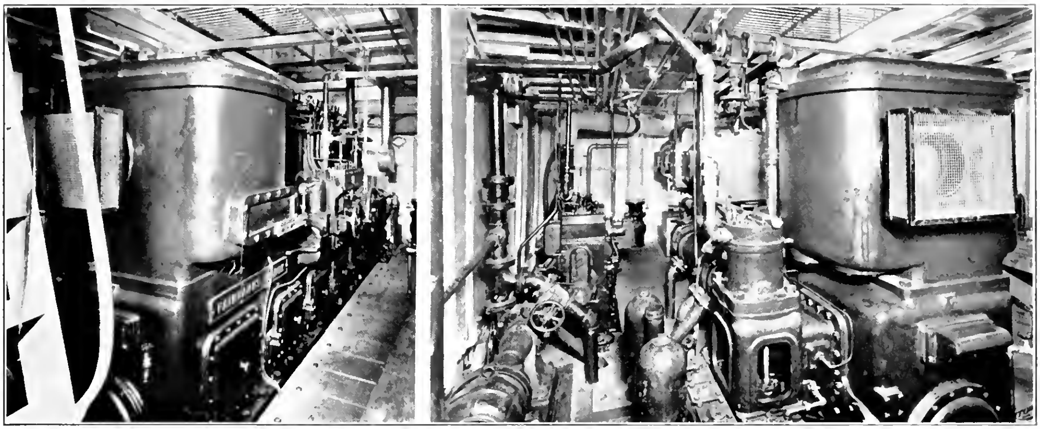
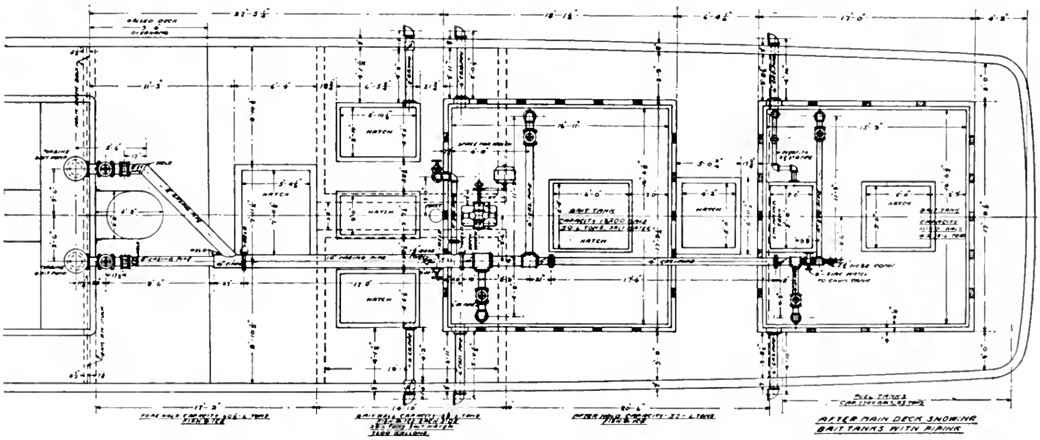




PLANS AND INTERIORS OF RELIANCE
Above, inboard profile of forward section of fishing boat Reliance showing heavy wooden construction of hull and location of machinery. At right, bait pump room with Fairbanks-Morse turbine type, vertical shaft pumps. Center, port and starboard views of Fairbanks-Morse 450-shaft horsepower main propulsion diesels installed in engine room of Reliance. Below, plan of after main deck of Reliance showing piping and connection for bait circulating water.





Evolution of the Electric Marine Cargo Winch

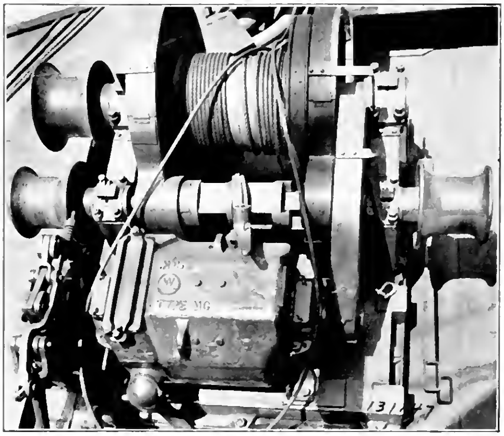
A Review of the Improvements in Electric Deck Machinery During the Past Ten Years of American Practice

By W. Edgar Martin*

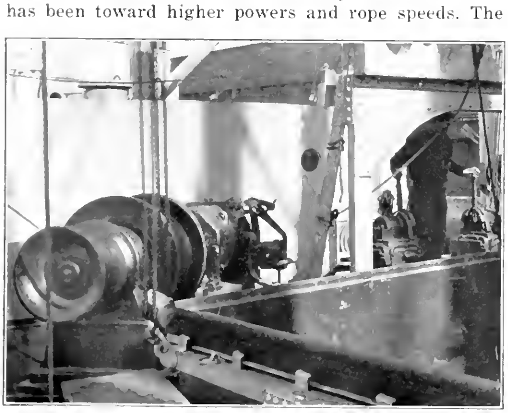
IT was about ten years ago that electric deck winches really came into their own. Up to that time nearly all winches on American-built ships were of the steam type, yet today few owners would consider using anything but an electric winch. Electrical equipment is available today that makes the winch absolutely reliable, quick in operation, quiet, clean, and last, but not least, a big fuel saver.

Some of the earlier electric winches built in the United States were not as fast as could have been built and were criticised for being slow, as were likewise the foreign installations of electric winches at that time. This fault was quickly overcome, as the owners were shown that with larger motors any speed desired could be obtained. Progress from loaded rope speeds of 200 feet per minute ten years ago to 600 feet per minute as is available today has brought the speed question to a point where it would be impracticable to handle cargo any faster.

The design of the deck winch motor of ten years ago has proved itself. In designing the winch motors for the United States Shipping Board's first motorship, William Penn, Westinghouse engineers foresaw an era of electrically operated winches and insisted on ultraconservatism of design to insure absolute reliability. In designing these winch motors special attention was given to water-proofing, mechanical strength, insulation for high temperatures, and proper speed. Hundreds of installations made since that time, all giving satisfactory service, bear witness to the foresight of these design engineers. The tendency with the motors has been toward higher powers and rope speeds. The control has changed from the earlier completely watertight cams and resistors to the more practical arrangement for magnetic control installations of mounting open resistors in a deck house and using only a watertight master drum control with contactor panel mounted in the deck house, and for manual control installations a water-tight cam controller with open resistors in the deck house.



Electric deck winch as installed on the motorship William Penn in 1921.

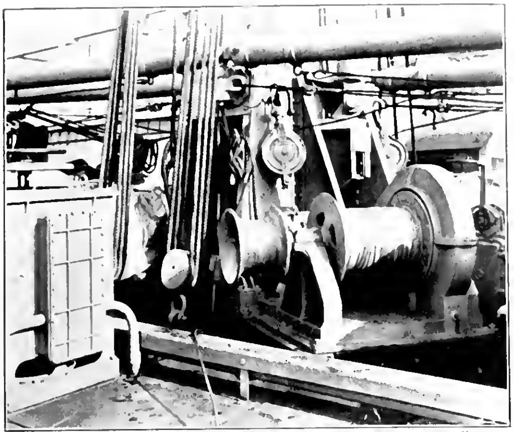


Electric deck winches on the motorship Californian, installed in 1922.

In 1921 the motorship William Penn was equipped with a compound geared winch giving two gear reductions, $12\frac{1}{2}$ to 1 for 5000 pounds, and $26\frac{1}{2}$ to 1 for 10,000 pounds. On these earlier installations, a foot brake was believed to be necessary, but since the operator is generally remotely removed from the winch, a mechanical brake is not needed with this type of electric winch.

In connection with this installation, the purchaser believed that with the clutch in neutral, a dangerous overspeed of the motor would result. For this purpose a very light shunt field winding was specified. Actually, the series characteristics would have been satisfactory, since after installation the shunt field was reversed from its normal connection without detrimental overspeeding of the armature. Since that time our experience indicates that, except for the particularly hi-speed circuit developed recently by Claytor, and for

*Marine Representative, Westinghouse Electric & Manufacturing Co., San Francisco.

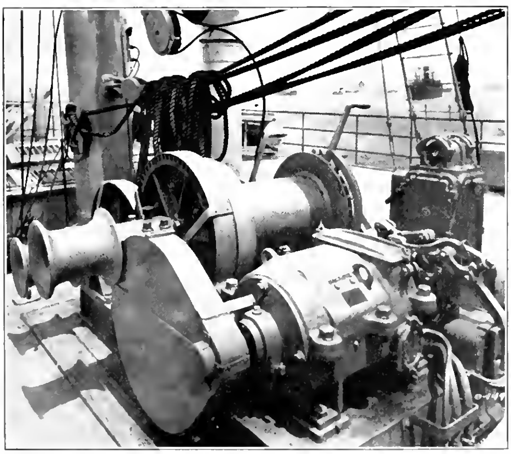


The electric cargo winch as installed on the motorship Challenger in 1924.

special cases of the friction drum type of winch, the series motor is entirely satisfactory for cargo winch service. The old type B solenoid brake, shunt wound, originally used gave splendid service, although now it is superseded by the newer type DW shunt brake.

The crane circuit giving dynamic braking in lowering was employed with this first installation, and is still used with success.

Since the shipyard could find no place for conveniently housing the protective panel and resistors, or even the controller, all these were provided with water-proof housings. The protective panel was made a part of the water-proof cam controller, and a special housing, to give ventilation of the resistors when in use, was provided for the grids and shunt brake resistor tubes. Resistors enclosed in this manner are inaccessible. Later owners and naval architects agreed that deck houses and raised platforms around the base of the cargo masts were a wise investment. In connection with conversion work, the United States Shipping Board cooperated most agreeably to offer adequate protection for electric deck equipment.

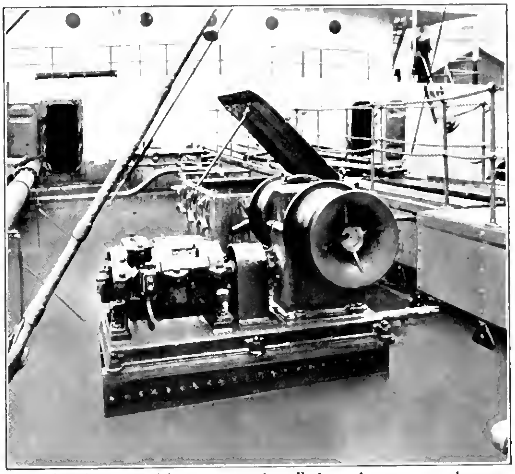


Friction drum type electric cargo winch as installed on U. S. diesel-electric hopper dredges of the A. MacKenzie class in 1924.

Another splendid record for the earlier installations is found in the motorship Californian (1922). On fourteen of her 30-horsepower winches the crane circuit was used, while two winches were fitted with the Shepard load-brake type of winch, which required the straight reversing circuit. With this, for either direction or rotation of this winch, with or without load on the hook, positive power is drawn from the line. During lowering, the absence of peaks is noticeable, which, of course, is an advantage in reducing the abuse at the commutator and brushes, and also arcing at the controller contacts.

On the motorship Seekonk (1923) the shipbuilders cooperated with the electrical manufacturer in supplying protected locations for the resistors for the cargo winches.The protective panels were still retained in the side of the cam controller casing, but the resistors were located in a small room below the platform. For this installation, the motor was of only 20 horsepower at 400 revolutions per minute.

The motorship Challanger (1924) was the first case



Electric worm drive gypsy as installed on the motor tanker J. W. Van Dyke.

of a mixture of ratings for cargo winch service. Ten 20-horsepower motors and two 30-horsepower motors, both at 400 revolutions per minute, were used on this vessel. This motorship was also the last to have watertight resistor housings, which were in improved form, having two compartments, one for the grid resistors and one for the tube resistors and terminals, the latter being more accessible than in previous installations.

Winches of the friction drum type were first electrified by the Westinghouse Company for the four United States hopper dredges of the A. Mackenzie class (1924). This is the first extensive application of the type CK motors to the marine field. The straight reversing circuit was employed.

The drums of these winches are seldom used, lines on the nigger-heads being the means of moving hatch covers, lifting machinery, or loading stores. Note that this is a double drum winch, each drum being separately controlled by means of a friction clutch handle. Although the 15-horsepower motor is installed, the time rating is one hour, which is twice the time rating usu-

(Please turn to Page 251)

The Log of A Pacific Ocean Tow

Notes on the Performance of Towboat Mamo, Towing Two Barges 2100 Miles from San Francisco to Honolulu

By Howard Oxsen

Howard Oxsen.

ON Saturday, March 28, in the face of threatening weather, the diesel tug Mamo put out of San Francisco Bay on its record-breaking tow to Honolulu, a distance of 2100 miles. Captain William (Bob) Purdy, veteran towboat skipper of the fleet of Young Brothers Limited, was in command. Chief Engineer Rudolph Nelson, transferred from the Mikimiki, was exhibiting broad smiles of admiration over the fine engine room equipment, especially the two Fairbanks-Morse, 750-horsepower, Model 37's, his new pets. H. W. Davenport of the Matson Navigation Company was all set for navigating the craft, which was well done, as we found ten days later when Molokai light appeared on schedule. The balance of the crew consisted of three Fairbanks, Morse & Co. engineers —J. Penberthy of Beloit, Wisconsin, E. P. (Ned) Green and the writer of San Francisco—a first mate, three quartermasters, two oilers, a cook, and one waiter, making a total of fourteen. This was increased to fifteen when a stowaway came up for air the first night out. He was subsequently assigned to galley duty.

The official starting time was logged as "Passed San Francisco Lightship 6:37 P.M.," but before this entry was made several fresh water sailors enjoyed a taste of outside weather, which was only a sample of what followed.

After passing the ferry lane in the bay, it was evident that the job of preparing for a long distance tow was in the hands of an experienced crew. The side canvasses were lashed in place and the long tow lines were let out and securely fastened over the stern roller without a false move. The tow line to the first barge consists of a cable pendant fastened securely to the tow bitt and extended past the stern roller where a swivel joined it to an 800-foot length of Tubbs 12-inch Supercore Manila line. The end of this rope was made fast to a length of heavy chain and then to the barge through a steel bridle, making a total distance to the barge of approximately 850 feet. This barge was partly loaded. The second barge was handled by the towing machine; and approximately 1300 feet of 2½-inch wire rope was let out, the end of the cable being made fast to this barge's bridle through a swivel and a length of heavy chain. Lights on the barges were supplied from storage batteries.

Crew and officers of the Mamo. Standing, left to right: E. P. Green and J. Penberthy of Fairbanks, Morse & Co.; Captain William R. Purdy and Rudolph Nelson, master and chief engineer; the cook; Howard Oxsen of Fairbanks, Morse & Co.; and H. W. Davenport, navigator. Crew sitting.

Date	Distance @		Av. Speed	En. RPM	HP*	Fuel Con #	Wind	Sea
Mar. 28	Passed San Francisco Lightship at 6:37 PM						N.W.	Moderate
Mar. 29	129	miles	7.23	225	900	956	N.W.	"
Mar. 30	178	"	7.33	228	920	1346	Light W	Smooth
Mar. 31	194	"	8.00	236	975	1390	" SW	"
Apr. 1	196	"	8.08	238	998	1424	S.W.	Moderate
Apr. 2	184	"	7.61	231	944	1352	N.W.	Rough
Apr. 3	180	"	7.42	230	936	1340	N.W.	"
Apr. 4	172	"	7.11	229	928	1320	N.W.	"
Apr. 5	213	"	8.79	245	1096	1525	N.W.	Moderate
Apr. 6	228	"	9.4	253	1200	1630	S.W.	"
Apr. 7	234	"	9.63	262	1400	1905	N	"
‡ Apr. 8	182	"	9.6	260	1340	1454	Calm	Smooth

‡ Pass Diamond Head 7:17 AM.
@ Running time each day 24 hours, 14 min. approx. Difference in time between San Francisco and Honolulu, 2½ hours. Distance at noon each day.
* Shaft horsepower, total both engines.
Actual running time, 10 days, 15 hours, 10 min.
Average speed 8.19 knots.
Fuel oil capacity of vessel 40,000 gals., approx.
\# Total fuel oil consumed 15,000 gals., approx. including auxiliaries.
Maximum exhaust temperature, 500°.
Maximum lubricating oil temperature from pistons 130°.
Displacement of tug, 575 tons (2240 #)
Length 129', beam 28', mean draft 12'.

Barges:
Length 181', beam 47', depth 11'.

An abstract of the log of the Mamo and notes thereon.

No mechanical trouble of any kind was experienced during the entire voyage of 10 days, 15 hours, and 10 minutes. The main engines, as well as all auxiliary equipment, functioned perfectly. Good installation and adequate preparation, based on experience, are the factors on which hinge the success or failure of a tow of this distance with uncertain weather conditions. No severe storms were encountered, although at times very uncomfortable seas were rolling under us, seas which persisted in coming from the port or starboard sides, being kicked up by northwest or southeast winds.

Daily mileage, weather conditions, engine speed, and other data are shown on the abstract log reproduced herewith. The normal engine speed rating of 260 revolutions per minute could not safely be obtained until the last two days on account of rough seas. At 262 revolutions per minute, each engine developed 700 shaft horsepower, with a speed of 9.6 knots, consuming a total of 76 gallons of fuel oil per hour for both engines, or 44 barrels a day. Accurate fuel oil consumption tests were made when weather conditions permitted weighing of fuel.

The expression "A sight for sore eyes" could aptly be applied to the Island of Oahu as it loomed up in the early morning of April 8. All hands were topside when signals were exchanged with the lookout at Diamond Head at 7:17 A.M. At 8 o'clock our tows were picked up by other tugs of Young Brothers' fleet and the Mamo entered Honolulu harbor with press representatives, photographers, and friends aboard, with every available whistle and siren shrieking its Welcome to Mamo—the "Big Chief" of Towboats.

Tuna Boat Reliance

(Continued from Page 230)

in the picture of the pumps installed. The motors are 15-horsepower.

A Baker ice machine, driven through Vee-belt by a Fairbanks-Morse induction motor, is of ample capacity to insure proper refrigeration of the stores for the crew, the fish cargo, and the cooling of bait tanks if necessary.

The deck auxiliaries are electric drive and include a Western-Enterprise anchor windlass, with Cleveland worm gear speed reduction unit, and an Allan Cunningham cargo winch.

Practically perfect ventilation is provided for the engine room through the installation of two blowers supplied by the Western Blower Company of Seattle.

A powerful transmitting and receiving wireless set was installed by the Radio Corporation of America.

Control of the circuits carrying power to all these auxiliaries is centered in a switchboard in the engine room. This board—a special deadfront type—was built by the Diamond Electric Company of Los Angeles to specifications of Fairbanks, Morse & Company. It mounts starter switches especially designed to take care of the induction motors on this ship.

Marshalltown gauges are used on pumps, and those on the pumps for lubricating oil, for engine circulating water, and for circulating water are equipped with electric alarms so that the engineer is notified in advance of any impending failure of these vital functions.

The galley is equipped with a "Flamo Gas" range supplied by the Standard Oil Company (Calif.).

It will be noted from the illustrations that there is ample space in the engine room to give easy accessibility for all inspection, adjustment, and repair operations on the main engine or auxiliaries. In fact there is a generously proportioned work bench and tool rack arranged on one side of this space on the working platform level. Reliance is using General Petroleum diesel fuel and Socony lubricating oil.

Rationalizing British Shipbuilding

By R. C. W. Courtney

THE past two years have witnessed a determined effort on the part of the British shipbuilding industry to adjust itself to present-day conditions by a system of rationalization entailing the elimination of obsolete or redundant shipyards. This is being achieved through the medium of a corporation jointly formed and supported by practically every firm engaged in shipbuilding in Great Britain, Northern Ireland, and the Irish Free State. In order to fully appreciate the events which have led up to the taking of these somewhat drastic steps, it is necessary to compare the present state of affairs with those just prior to and immediately following the war period. Up to 1914 many of the principal firms were engaged almost entirely in warship production, a class of work which accounted for 25 per cent. of the value of the entire output of British yards, whilst a considerable amount of merchant tonnage was built for foreign account. During the war and immediately afterwards numerous extensions were made, new plants and berths were laid down, and many entirely fresh yards came into being.

It is understood that various schemes to eliminate redundancy were discussed from time to time, and eventually the National Shipbuilders Security Limited was registered on February 27, 1930, with a nominal capital of £10,000, but with powers to borrow up to £3,000,000. This company is sponsored by 46 firms, who were responsible for 93 per cent. of the tonnage produced in 1929, and is managed by a board of 10 directors, all of whom are prominent shipbuilders. The leading object was stated to be the assistance of the shipbuilding industry by purchasing and dismantling those yards surplus to present time requirements and the disposal of their sites for purposes other than ship construction. Provision was also made for reorganization schemes to be effected if considered to advantage.

Up to the present the financing has been accomplished by an issue of £1,000,000 worth of 5 per cent. first mortgage debenture stock at 95 per cent. which has been guaranteed by each of the contributary shipbuilding concerns agreeing to pay the company a levy of 1 per cent. on the contract or sale price of all vessels upwards of 3000 feet in length built by them after November 1, 1930. Such a levy on the average value of tonnage built by these firms over the seven years ended December 31, 1930, would amount to £239,190 per annum, or about 4½ times the sum required to meet the interest and sinking fund. But it was pointed out that owing to the general trade depression this figure may not be maintained in the immediate future. The issue was offered to the public on January 22, last, and the requisite amount subscribed in a matter of hours.

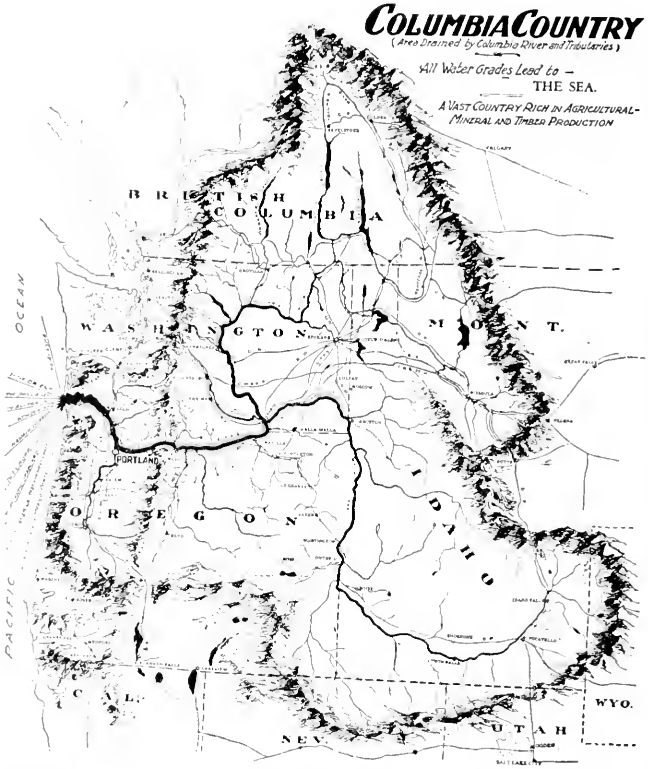
The work already taken in hand includes the purchase of the following concerns, all situated in the Clyde area. The Dalmuir Yard of William Beardmore & Co., the South Yard of the Ardrossan Dockyard Co., and Napier and Miller, Old Kilpatrick. A smaller yard at Lowestoft on the east coast of England which in the past has specialized mainly in fishing vessels has also been acquired. The closing of the Dalmuir concern is the most important undertaking so far, as this yard was one of the largest on the Clyde and in the past had been responsible for many important warships and liners.

Navigation on the Columbia River

Part IV. A Description of the Columbia and the Snake Rivers and of the Problems Confronting Attempts to Reopen Navigation

By Charles F. A. Mann

THE Columbia River rises in north central British Columbia and flows south and west for approximately 1200 miles, to the Pacific. Its headquarters are in the little known Columbia Ice Fields in the northern Canadian Rockies, which act as a gigantic regulator for the river, flowing most during the early summer months, when its numerous tributaries downstream are drying up. Some of the tributary streams drain the eastern slopes of the Cascades and a portion of the southern and western slopes of these same mountains in the state of Washington, and also part of the Rockies, where late thawing snow and ice add to its supply of water. Winter rains in most of the areas near the headwaters of its tributaries, together with the glacial waters, give the Columbia River a remarkably well balanced water supply. Stream flow averages approximately 200,000,000 acre feet of discharge into the Pacific. Three fourths of this flows through the Columbia River Gorge, while 50,000,000 acre feet originates in tributaries west of the Cascade mountains. The Snake River, its chief tributary, discharges approximately 48,000,000 acre feet where it joins the Columbia at Pasco, Washington.



Map showing the basin of the Columbia and Snake covering approximately 250,000 square miles.

Figures of this nature do not mean much unless reduced to comparative figures with America's two other famous rivers, the Mississippi and the Colorado. The Mississippi has approximately 200,000,000 acre feet average discharge. The Colorado has an average of only 16,000,000 acre feet, with variations between dry and wet years of from 6 to 26 million acre feet, and with extremely variable discharge from day to day over a year's time. The Columbia drains about 300,000 square miles of territory; the Mississippi about 1,250,000 square miles. It is easy to deduce that enormous power potentialities arise in the Columbia, which rises in the highest part of the continent, and drops steadily to the sea, and with an enormous volume. Estimates on power available in the Columbia are widely varying. Without storage or flood control 12,000,000 horsepower is available, but with storage to equalize the river flow, estimates run as high as 21,000,000 horsepower. All of California, Nevada, Utah, Arizona, including the much advertised $165,000,000 Boulder Dam(n), and part of New Mexico are only capable of generating about 17,750,000 horsepower with full storage. All of the area west of the Mississippi and east of the Rockies about 8,000,000 potential horsepower, and all east of the Mississippi, about 20,000,000 horsepower, with full storage.

The Columbia, then, will easily be seen to be a river of enormous size and potentialities. The diagram of its fall from Flathead Lake, Montana, through all poten-

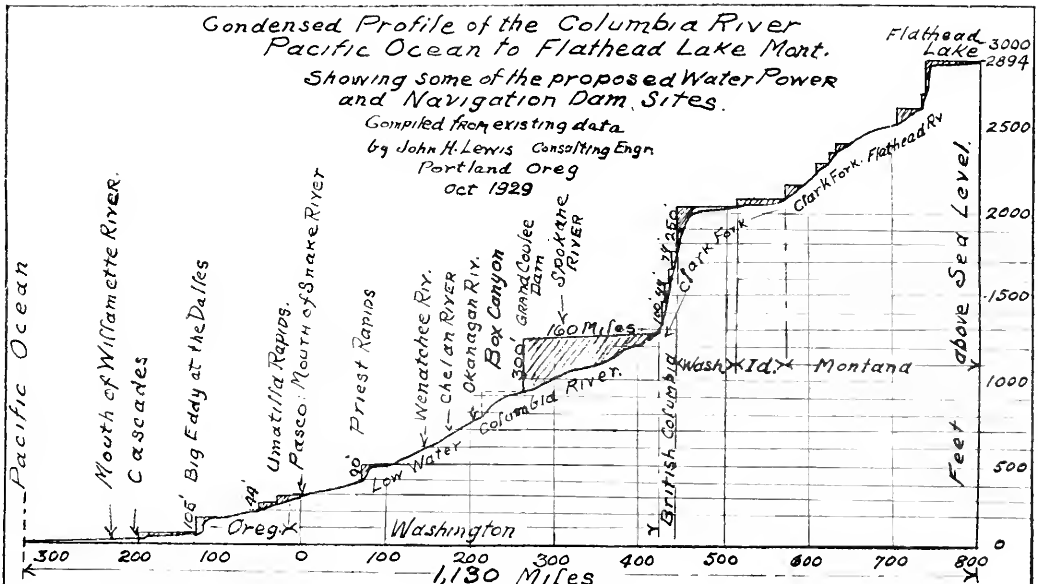
View on the Columbia below Umatilla Gap, taken ten years ago and showing one of the last of the upper river fleet of the old O. W. R. & N. boats headed down stream on her last trip. Two railroads, two highways, and the airplane route all use this gorge.

tial power sites, will give a comprehensive idea of the numerous sites for power dams in the Columbia proper. Twelve major sites exist on the Columbia and Snake Rivers; and it takes no filght of imagination to visualize that the lakes impounded by power dams will ultimately form a main part of the navigable channel of the upper river. Before this time comes, a program of orderly development of the river must be laid down, and in all probability navigation on the Snake as far as Lewiston and on the Columbia as far as Priest Rapids, near the centers of the present wheat belt, will form the initial developments.

Channel Conditions in the Columbia

Channel conditions in the Columbia at present are worthy of study. They supply the answer as to why the great era of river navigation described in the three previous sections of this article ended and left the river to flow unused to tidewater, and even left the Celilo canal and Cascade locks to crumble. The tabulation reproduced herewith shows channel conditions from Portland to Priest Rapids, south of Wenatchee, on the Columbia, and on the Snake from its confluence with the Columbia to 30 miles above Lewiston, embracing the great Palouse wheat country and the sections of the rivers most likely to be improved and used.

Towboats or river stern-wheelers, in order to navigate conditions such as these, would need to have at least 2500 horsepower to haul 500 tons of freight upstream. Obviously this is too much power. Under present conditions it would require five days for five barges and a tug to go 31 miles between The Dalles and Rock Creek Rapids. Between rapids the Columbia presents a great series of pools, dropping from the edge of one lava sheet to another in wild dashes, only to broaden out into a navigable stream, usually very deep and of



greatly retarded flow. This stream and the Snake have cut deep gashes in the great lava sheets that underlie the Columbia Basin country, so that the streams flow through deep gorges in a great rolling plain.

The Snake River rises near the western end of Yellowstone Park and flows north and west in a tortuous course for about 1300 miles. It cuts a deep gorge, in places 3000 feet deep, after leaving Huntington, in its drop to Lewiston. Above its banks are high rolling plains, rich in grain, sheep and cattle resources. The same is true of the middle Columbia between Wenatchee and The Dalles. On the Snake, between Pasco and Lewiston, there are 55 landing places, and on the Columbia 59 between Vaucouver, Washington, and Priest Rapids. These landing places are as strategically located today as they were a quarter of a century ago when the river boats stopped for cargo. Reopening a navigable channel will start river traffic upstream into the heart of this fertile land. It is the 19 miles of rapids, averaging a fall of 4.5 feet per mile and a velocity of stream of about 10 miles per hour, that have limited tonnage on the river steamers, virtually closed the entire upper Columbia and Snake to traffic, and ended the golden era of the Columbia navigation of a half century ago.

The annual flood of the Columbia, from melting ice and snow, lasts about two months. It rises slowly and, after remaining at its high level for a few days, slowly recedes. Ice is troublesome in the river for about a maximum of six weeks a year, but as far as upper river barge navigation goes this season comes at a time when no crops or rush cargoes have to be moved. On the lower river, when this ice slows down and gums up river traffic for the ocean liners and local craft, then it becomes a serious matter.

During flood season, at about a 13- to 15-foot stage of the river, the Columbia is navigable to above Wenatchee. From the head of Priest Rapids below Wenatchee to Arrowhead Landing (British Columbia) is 488 miles, of which 225 are navigable all the time; 113 more are navigable at favorable stages; 109 are classed as strictly a sporting proposition for daring skippers; and only the remaining 11 miles are impassable. Thus the problem of constructing power dams on the favorable sites on the river above Priest Rapids is of great importance and will eventually carry navigation right into Canada.

Slackwater navigation behind power dams at strategically located rapids involves the construction of seven dams between Cascade Rapids and Umatilla Rapids averaging about 50 feet in height, with one at Celilo about 105 feet high. These low dams would flood little of the present townsites or railroad lines, and would give several million primary horsepower and much secondary, or flood stage horsepower, to be used for irrigation purposes. At Umatilla, approximately 300 feet above sea level, a dam 50 feet high is proposed, to cost $45,000,000. This dam site is located adjacent to about 500,000 acres of irrigable land, and, by utilizing the flood waters for power and pumping it would irrigate that land, besides generating about 420,000 primary horsepower. Lockage through this dam would involve a rise of 57 feet. The river here flows 72,000 second feet for 90 per cent. of the time. Flow here is twice the minimum and maximum flows of the Mississippi at the famous Keokuk dam. Annual charges, charged solely against power sales, amount to $3,240,000 per year, or $0.0012 per kilowatt. At $0.002 per kilowatt rate of sale at the powerhouse, the cost of the project providing free navigation would amortize in 42 years. Current minimum charges in the nearest power market in Portland are 2 cents, or ten times this figure.

The chief question has been what to do and where to sell such vast blocks of power in the Northwest, already well supplied. The answer is that the power de-

(Please turn to Page 241)

1. Portland to mouth of Willamette.
   Distance 12 miles.
   Low water depth 30 feet.
   Low water velocity tidal.
   High water velocity 3 to 4 miles per hour.

2. Mouth of Willamette to Vancouver.
   Distance 4 miles.
   Low water depth 25 feet.
   Low water velocity tidal.
   High water velocity 3 miles per hour.

3. Vancouver to Bonneville.
   Distance 38½ miles.
   Low water depth 9 feet.
   Low water velocity tidal.
   High water velocity 3 miles per hour.

4. Bonneville to Cascade Canal.
   Distance 4 miles.
   Low water depth 7 feet; on sill 8 feet.
   Low water velocity 7 to 8½ miles per hour.
   High water velocity 14 to 17 miles per hour.

5. Cascade Canal to city of The Dalles.
   Distance 41 miles.
   Low water depth 12 feet.
   Low water velocity 1 mile per hour. 4 foot fall in 40 miles.
   High water velocity 3 miles per hour.

6. The Dalles to lower entrance Dalles-Celilo Canal.
   Distance 3½ miles.
   Low water depth 10 feet.
   Low water velocity 1 to 2 miles per hour.
   High water velocity 10 to 15 miles per hour at 3 mile rapids.

7. Dalles-Celilo Canal.
   Distance or length of canal 8.6 miles.
   Low water depth on lock sills 7 feet.
   Low water depth in canal trunk 8 feet.

8. Head of Celilo Canal to below Homly Rapids.
   Distance 118 miles.
   Low water depth of these several rapids 5 plus feet.
   Low water velocity 10 miles per hour.
   High water velocity 10 miles per hour.
   (Note: In this part of the river, velocity increases in narrow gorges during high water period. In wide shallow portions of the river, where there is a narrow channel, velocity increases in low water periods.)
   (Homly Rapids. Low water depth 4½ feet; this is controlling depth in river between the mouth of the Snake River and Portland.
   Low water velocity 7 to 8 miles per hour.
   High water velocity 6 miles per hour.)

9. Homly Rapids to mouth of Snake River.
   Distance 5½ miles.
   Low water depth 7 to 8 feet.
   Low water velocity 2 to 6 miles per hour.
   High water velocity 2 to 6 miles per hour.

10. Mouth of Snake River to Priest Rapids.
    Distance 76 miles.
    Low water depth 3½ feet on several shoals.
    Low water velocity 3 miles per hour.
    High water velocity 5 miles per hour.

11. Snake River from mouth to Riparia.
    Distance 60 miles.
    Low water depth at Long Crossing Bar 2½ feet; elsewhere 4 feet.
    Low water velocity maximum 10 miles per hour.
    High water velocity maximum 8 miles per hour.

12. Riparia to mouth of Grande Ronde River. (30 miles above Lewiston)
    Distance 107 miles.
    Low water depth 2½ feet at Log Cabin Rapids.
    Low water velocity 6 to 8 miles per hour.
    High water velocity 6 miles per hour.

A tabular statement of river conditions at various parts of the Columbia and Snake Rivers.

Diesel Engine Lubrication

Part V. Some Notes on the Purifying and Reconditioning of Lubricating Oil

By Arthur M. Tode

Diesel Engineer, Technical Department, The Texas Company

SUCCESSFUL lubrication depends first upon the lubricant, second upon the way the lubricant is applied, and third upon the precaution taken, to not only prevent its contamination before it is applied, but also to keep it clean while it is used over and over again.

The formerly believed theory that oil "wore out"—that in constant use day after day it broke down and lost its lubricating qualities is now no longer accepted. Lubricating oil does not wear out in diesel service, although the color of oil which has been purified may be slightly darker than the original oil. The oil may, however, become so polluted from numerous sources that it ceases to be an efficient lubricant. Dirt, water, metallic particles, and sand from cast parts of the engine form some of the contamination. From the breakdown of oil in the system various asphaltic sludges and carbon are formed. Abrasive materials, if allowed to remain in the oil, will cause excessive wear on lubricated parts. Sludges and emulsions formed with water and the carbonaceous residues from burnt oil frequently clog passages, causing failure of the supply of oil to bearings, resulting either in quick shut-down or, if not caught in time, extensive damage and expensive repair.

Foreign Impurities

The lubricating systems of single-acting engines whose power cylinders are open to the crankcase are particularly liable to contamination by foreign impurities. Incombustible matter in the fuel, carbon particles, and other impurities may mix with the cylinder oil, and working past the pistons are drained to the crankcase. Over a period of time such impurities may collect in extensive quantities and become sources of real danger.

Contamination is also brought about where engines operate in dusty surroundings and impurities are introduced with the intake air. Such foreign particles, together with mineral dust, may enter the bearings with the lubricant and are apt to cause considerable wear..

Emulsions

Lubricating oil predisposes to emulsify in the presence of impurities and water. Water caused by condensation or by leakage from the cooling system may produce, in conjunction with carbon and dust, a persistent emulsion. The natural sequences of such emulsions are deposits on cooling coils which will cause their insulation, clogged oil ways restricting oil flow to the bearings, and in some cases failure of the lubricating oil film culminating in bearing troubles.

The presence of iron oxides, such as rust, cause an increase in the rate at which all this may occur; especially will they hamper the separation of water from the oil. The oil in service must, therefore, be kept clean for it must not only lubricate effectively in order to reduce wear, but also it must be capable of protecting the wearing surfaces against rust or corrosion when the engine is shut down.

Oil Oxidation

Lubricating oil being a complex mixture of hydrocarbons may develop impurities by oxidation. This condition is brought about by service in a circulation system and is accelerated due to heat and the pulverizing of the lubricant into a fine fog or mist.

Some hydrocarbons are soluble in oil while others are insoluble. The former are not deposited at normal operating temperatures. Where there is a sufficient reducing in temperature, however, as on the cold surfaces of cooling coils and in some parts of the lubricating system, they may be precipitated. When such insoluble oxidized hydrocarbons are present in the circulation system besides impairing the resistance of oil to emulsion, they interfere with oil cooling, clog oil piping, and may possibly prevent the lubricant reaching the bearings.

Sludge and Carbon

Impurities which may be prevalent in a circulation system will tend to be intimately mixed with the lubricating oil, particularly under such favorable conditions as pressure and heat when passing between bearing surfaces. During idle periods of the machinery the impurities tend to settle out from the oil, the free water collecting readily at the bottom of the engine base or crank case. Other impurities in suspension do not, however, settle out so rapidly, and such sludge may even be so light as to remain in suspension. Subsequently, upon the next starting of the engine the impurities are likely to be again drawn into circulation.

Carbon is also a sludge creator, tending in addition to impair proper lubrication even when held in free suspension in the oil. Furthermore, this suspension of minute particles of carbon is claimed to render the problem of purification considerably more complex than it normally is in steam power plant service. In general such carbon will not settle out readily from the oil, rendering simple gravity separation a difficult matter. Filtration, centrifugal action, or agitation in the presence of a coagulant throwing down the carbon, however, are all effective methods of purification. In addition these systems serve to remove water and other contaminating foreign matter. It must be borne in mind, however, that a certain amount of loss will accrue which must be taken care of by the periodic addition of a suitable amount of new or purified make-up oil.

Other Contaminating Factors

There are numerous contributory factors which determine the rate at which impurities accumulate in a circulation oil system. The particular type and [illegible] of an engine together with the quality of lubricating oil used are among the determining influences. The mechanical condition of the unit is important with reference to the condition of its pistons and rings, the tightness of the cylinder liner and water jacket joints, the water connections for piston cooling, as well as the proper control of cooling water.

Incomplete combustion whereby fuel is left in the cylinders in liquid or carbon form, due to improper atomization, will result in contaminating the lubricating system. Other factors entering into this important matter include: Engine operating temperatures; cleanliness of the fuel burned; and extent to which the oil in the lubricating system is effectively purified.

Continuous By-Pass System

On engines equipped with pressure circulating systems where a large quantity of oil is being circulated at a very rapid rate, the continuous by-pass system is without doubt the most practical way to connect the purifier to the system.

The continuous by-pass system is arranged so that a certain percentage of the total amount of oil is continuously passed through a purifier. The rate through the purifier should be sufficient to handle the entire volume of oil in the system once every two to six hours, depending on the kind of engine and its average load factor. With such a system the accumulation of water and other insoluble impurities is retarded by providing for a definite withdrawal of a part of the oil in circulation and its purification before it is returned to the system.

It is desirable that the oil be taken from the lowest point in the circulation system, usually the bottom of the engine sump tank, from whence the oil is passed through either a filter or centrifuge whereby water and insoluble impurities are removed.

In one type of continuous by-pass system the feed line is located at the bottom of the sump tank and close to the drain line from the engine. The object is to deliver the dirtiest oil in the system to the purifier. Some dirt will settle in the tank and the purifier will be eliminating this continuously. The location of a baffle in the tank assures that the cleanest oil in the tank will go to the engine. A heater may be provided so that the used oil can be further thinned before going to the engine. Sometimes a cooler is also installed so that clean oil can be returned to the system at a proper temperature. However, if the amount of oil in a system is large, oil coolers are frequently eliminated as the heat is dissipated in the sump tank while awaiting purifying.

Where gravity oiling is employed on an engine the used oil is pumped from the crank case to an overhead supply tank. This tank has a conical bottom into which the impurities contained in the oil settle by gravity. A portion of the oil is drawn off continuously from the bottom of the tank and diverted to the centrifuge after which it again enters the system for recirculation.

Batch Purification

The batch system is generally used for the purification of oil from smaller engines where the oil supply is from gravity sight feed or mechanical force feed lubricators. The oil passes once through the engine without recirculation. This oil should not be discarded, as real economies can be effected by saving it until sufficient volume has accumulated and then purifying it.

Even where the continuous purification system is employed it may be desirable to periodically subject oil to batch treatment to assure removal of all impurities, for by no other method is their accumulation in an oiling system positively eliminated. The necessity for batch purification and the frequency of this kind of treatment depends on the facilities and the conditions of operation. Where possible the entire charge of lubricating oil should be withdrawn from service, purified by one of the several settling processes, and then run into a clean tank. It is, of course, desirable that such batch purification be arranged on a schedule so as not to interfere with normal engine operation.

Filter Purification

While not adaptable with reference to large diesel engines, where centrifugal purifiers are the only effective means of handling large quantities of lubricating oil, filters are used in small plants and sometimes employed in conjunction with centrifugal machines. The function of a filter is to pass the lubricating oil through certain materials which serve to catch and hold solid matter. Filters differ in a sense from the strainers which are usually provided in the oil lines of circulation systems to remove coarse particles. Filters vary widely in the methods used to effectively cleanse the products; but the requirements of any successful filter embody the following:

a.—A means for reducing (if necessary) the viscosity of the entering oil. Steam coils are frequently used for this purpose, and in some cases electric heaters have been used.

b.—Ample precipitation area for the deposit of sediment. The oil should come to rest for a sufficient time to permit precipitation of foreign matter.

c.—Suitable facilities for the separation of water. The water so separated must be readily trapped out.

d.—A suitable system, preferrably of cloth filtering mediums for so-called "dry filtration." The ideal method of arranging a filtering cloth is to maintain it in a vertical position without pleats or folds, so that accumulated dirt will tend to slide vertically down from the cloth or filtering medium and not retard the oil flow through the cloth.

e.—In all but the smallest oiling systems a multiple unit design. This involves more than one filter unit so arranged that one unit at a time may be cut out from the system for changing filter mediums without interrupting the continuous flow of oil through the system.

Settling Tanks

The simplest as well as the cheapest method of purifying oil is by settling. To attain effective settling the body of the oil must be in a state of complete rest or quiet for a sufficient period of time. This is, furthermore, dependent on the relationship between the oil's specific gravity and viscosity, as well as the character and relative weight of the impurities involved.

Some impurities settle out from the oil quite rapidly while others settle slowly. Suspended impurities in low viscosity oils will settle more readily than in oils of high viscosity. Some oils will be purified by allowing them to stand for twelve hours or even less, while other oils may have to be similarly treated for a week. In all cases complete quiet within the body of the oil is absolutely necessary.

It is possible for oils to become polluted with impurities of so light a character that the oil can only be cleansed by special means of hastening settling. These methods for purifying include heating, blowing with steam, boiling with hot water, and the addition of coagulants. Of these special means the simplest is probably an arrangement of steam or electrical heating coils in a vertical tank with conical bottom. After heat is applied to a tank of dirty oil and the temperature raised to about 180 degrees Fahrenheit, the heat is disconnected and the hot oil is allowed to stand undisturbed. The impurities should have settled out by the time the oil is again cold.

Centrifugal Purification

Centrifugal purification is a mechanical process for accelerating the separation of impurities from liquids by rotating the liquids at high peripheral speeds. Centrifugal pressure is easily capable of being developed to a point several thousand times greater than the force of gravity; and its application for separating, purifying, or clarifying oils is, therefore, most desirable. Practically speaking, centrifugal purification is gravity turned sidewise and brought under perfect control as to the degree of pressure exerted and the effectiveness of its application.

The effectiveness of a centrifugal machine depends not so much on the amount of centrifugal force generated as on the manner in which such force is applied within the bowl. The amount of centrifugal force developed by any machine varies directly with the diameter of the bowl and the square of the speed of rotation.

Impurities are more easily and more completely separated by centrifugal action when the film of oil acted upon by the centrifuge is comparatively thin. The separation of impurities from the oil is improved if the oil is warm, and proper means for heating the oil before centrifuging should be provided in order to reduce its viscosity. As the effectiveness of the centrifuging process depends on the character and viscosity of the oil and the amount and kind of contamination, the speed at which the oil is fed through a centrifuge must be carefully gauged, and the rate of flow properly adjusted by the operating engineer.

Navigation on the Columbia

(Continued from Page 238)

mand is doubling about every six years. From a navigation standpoint, the Umatilla dam backs water as far as Priest Rapids, where a dam 90 feet high has been projected by the Electric Bond and Share Company's subsidiary to generate 500,000 primary horsepower. Slackwater back of this goes to the site of the Rock Island Dam, below Wenatchee, the first power dam to be built on the Columbia, started in 1929 and will generate 400,000 horsepower for the Puget Sound Power and Light Company. Building of this dam during 1930 and 1931 is considered to be the biggest event on the Columbia River since navigation ceased forty years ago. Space is provided in the dam for building of locks for ships when the time comes to use them. This dam is 30 feet high, and navigation will be extended to Beeble bridge above Wenatchee. A low dam above this would extend navigation to 150 miles above Wenatchee.

At Foster Creek Rapids a dam 187 feet high would generate 800,000 horsepower and extend slackwater to the site of the famed Grand Coulee Dam—the giant of all Columbia River dams—that would divert part of the river back through its ancient channel, the famous Grand Coulee, to the high plains above in the Columbia Basin. This dam has been variously estimated in height from 220 feet to 350 feet and even 600 feet high. The 220-foot dam would generate 1,200,000 primary horsepower and 1,000,000 secondary horsepower, while the 350-foot dam would generate 2,000,000 primary and a like amount of secondary power, and back water clear to the Canadian boundary and within 30 miles of Spokane. A 26-foot dam built on the Canadian boundary would create slackwater navigation to Revelstoke, 150 miles further northward toward the Arctic circle!

Congress has appropriated $600,000 for use of the United States Army Engineers, under Colonel Gustave R. Lukesh, to survey in minute detail the whole Columbia Basin area, for navigation, power, reclamation, and flood control possibilities. His report will be delivered to Congress in June, 1931; and upon it hinges the plan of development of the Columbia River of to-morrow.

View taken from an elevation of 2460 feet looking up the Columbia River below the southern end of Grand Coulee, showing Priest Rapids on the left, Saddle Gap in the distance, and lands of the Priest Rapids' Irrigation Project on the right bank. This is approximately 350 miles up the Columbia from Portland.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part VII.—Cold Air Systems

By L. L. Westling

THE refrigeration of very large spaces such as holds of vessels becomes a more complex problem than the smaller spaces which have been described in previous chapters. The use of direct expansion becomes inadvisable because of the excessive amounts of refrigerant, and the resulting long leads and circuits. When brine is used, there remains the problem of great weights of piping, coils, and brine. In consequence the most desirable method of refrigerating such spaces is by the use of cold air systems, in which the coils are located in a separate room, through which the air is forced by means of fans. By this means the cold air is conducted through a system of ducts and false bulkheads to the cargo spaces. This system is particularly well adapted to rooms operated at temperatures above 32 degrees Fahrenheit, and can seldom be recommended for lower temperatures. When freezer service is required it is much more satisfactory to augment the refrigeration with wall coils, in addition to the cold air circulation, this combination effecting a very flexible arrangement for a wide range of temperature work.

The coil room may often be located and fitted into spaces which, due to their inaccessibility, are of little value for other purposes; they may be on the same level as the refrigerated space, may be above or below, and such flexibility of location often permits of very efficient use of ship's space. This room is constructed and insulated in the same manner as the cargo spaces, except that it is advisable to lay stress upon the waterproofing of all materials. Frequent defrosting of the coils results in the draining of much water; and adequate means of carrying this off must be supplied. It is advisable in smaller coil rooms or boxes to line the deck with a lead sheeting to insure protection of the ship's structure against rusting and corrosion. Large coil rooms should have deck coverings of bitumous materials.

The coils, as has been shown in previous chapters, should have approximately 50 to 60 per cent. of the cooling surface that would be required for direct refrigeration. The coils may be installed in a vertical or horizontal position, but to insure that they may not become air bound, the horizontal position is generally advisable.The coils may be staggered to provide a longer path of air current through them; and it is advisable to split the coils into two or more circuits for flexibility of operation, for defrosting, and for repair or conditioning.

Temperature degrees F.	Volume of one pound of air Cubic Feet	Heat content per pound of dry air B.t.u.	Heat content of one pound of saturated air B.t.u.
0	11.59	0.000	0.964
10	11.86	2.411	4.019
20	12.13	4.823	7.446
30	12.41	7.234	11.429
32	12.47	7.716	11.783
35	12.55	8.44	13.02
40	12.70	9.65	15.21
45	12.85	10.86	17.59
50	13.00	12.07	20.19
55	13.16	13.28	23.04
60	13.33	14.48	26.18

Properties of dry air at various temperatures.

The air passages leading to the cargo spaces due to their size usually serve a duel purpose, that of a passage way, from which the attendant may have access to the ports in the bulkheads, and for observation. These ducts are generally constructed of wood, with little or no insulation on the cargo faces, and the inner surfaces should be as smoothly built as possible to reduce resistances to the air flow to and from the blowers.

For reasons already given, the system should be reversible, and the direction of air flow should be changed at regular intervals; but on medium sized plants, in which the passage-duct would be a great loss of revenue space, the system is often built on the one-way flow scheme.

In both systems, the opposite sides of the cargo space is built up of false bulkheads in which are installed at least three tiers of sliding ports, through which the air is directed or controlled as it moves to and through the cargo. These ports are of wood, with approximately 20 square inches of effective area, the opening being made rat-proof with wire mesh or perforated plate. Means should be provided for adjusting the size of openings. One tier of ports should be located close to the deck, one at half height, and one near the deck head; and all false bulkheads should have battens secured on each side of the vertical rows of ports to prevent cargo being stowed or shifting against the port opening and thus shutting off the air supply.

In the nonreversible system where the ports are inaccessible, they must be adjusted before the cargo is stowed for the proper direction of the air through the cargo. This requires a certain amount of guessing as to the volume of cargo and what will be the effect of loading and discharging in ports of call. Access to these openings is to be preferred wherever it is possible to so arrange it. Careful adjustment of these ports in the smaller one way flow systems should bring good results, although the reversible flow system is more acceptable in point of operation.

In all forced-air circulation systems, means should be provided for the removal of foul air and the addition of fresh air. This may easily be effected by a system of dampers and/or outlets connected to the suction side and the discharge side of the fans. The ingress of new moist air and the venting of dry foul air cause a variation of the moisture content of the air in the room, and unless great care is exercised this change may be too abrupt and may be great enough to bring unfavorable conditions within the space. The usual means of providing this change is by the removal of plugs in the ventilation ducts at regular intervals; but the more satisfactory arrangement is to continuously "bleed off" through a small connection from the discharge duct and by the same means provide, continuously, the fresh air.

The value of humidity control is coming to be more appreciated by the marine fraternity. Ashore, it ranks second only to the proper temperature in the successful storage of perishables. When bunker coil room and fans are used it is common marine practice to "bleed off" approximately 5 per cent. of the air handled and, of course, means for ingress of fresh air of like amount must be provided.

Cold Air System

In designing the cold air system of refrigeration in which the bunker or coil rooms are used, the following method of calculation will determine the amount of air required for circulation. The refrigeration load for the particular space to be cooled is first determined in terms of tons of refrigeration and the calculation is as follows:

(The specific heat of air is first determined by inverting the formula for specific heat)

$$\text{Capacity in B.T.U.} = \text{Weight} \times \text{Specific Heat} \times \text{Temperature Rise}$$

$$\text{or Specific Heat} = \frac{\text{Capacity in B.T.U.}}{\text{Weight x Temperature Rise}}$$

For one pound of air the equation becomes:

$$\text{Specific Heat} = \frac{\text{Capacity in B.T.U.}}{\text{Temperature Rise}}$$

We find from the following table that the capacities of the air varies with the temperature, hence the mean condition applied to the formula will give:

$$\text{Specific Heat} = \frac{\text{Capacity of air out} - \text{Capacity of air in}}{\text{Temperature out} - \text{Temperature in}}$$

Then again turning to our specific heat formula:

$$\text{Weight of air to be moved} = \frac{\text{Total heat to be removed from the space}}{\text{Specific Heat x Temperature rise of air}}$$

Assume a problem for clarifying these equations; for instance, One ton of refrigeration is to be removed from a space in one day with air temperature entering the space at 40 degrees Fahrenheit and leaving the space at 45 degrees Fahrenheit. How much air must be circulated through the cargo per minute to accomplish this?

1 ton of refrigeration = 288,000 B.T.U. per day
= 200 B.T.U. per minute

Referring to table

$$\text{Specific heat of the air} = \frac{10.86 - 9.65}{45 - 40} = \frac{1.21}{5} = 0.242$$

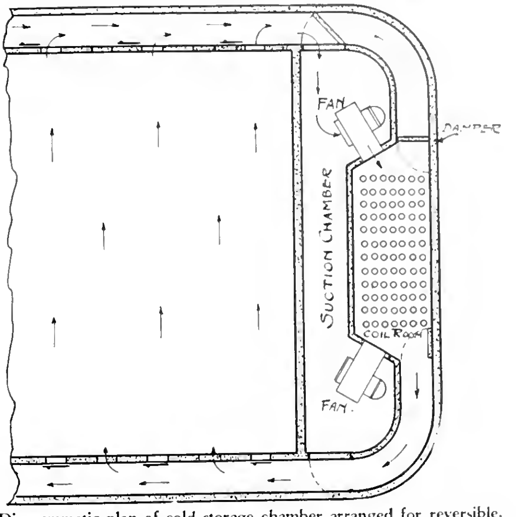
Then, weight of air to be circulated per minute

$$\text{Weight} = \frac{200}{0.242 \text{ x } 5} = 165 \text{ pounds}$$

By the table the specific volume of air at 40 degrees Fahrenheit is 12.70 cubic feet per pound; hence,—

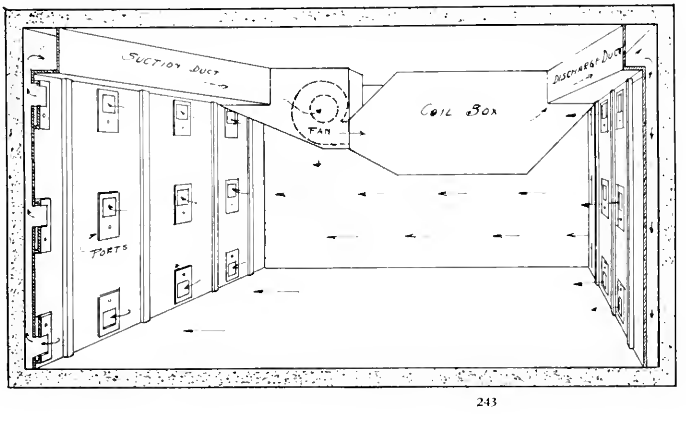
165 x 12.70 = 2095 cubic feet per minute to be circulated through the cargo.

Losses from various sources, friction head through ducts, bunker rooms, and through cargo must be estimated for the individual installation, and the size of fan and motor must be determined accordingly. Moisture in the air increases its heat carrying capacity perceptibly; but the dry air formula will give a good margin of safety in design.



Diagrammatic plan of cold storage chamber arranged for reversible, cold-air system.

A rule of thumb for determining the volume of air to be moved allows one cubic foot per minute for every three cubic feet of the space being refrigerated.



Diagrammatic sectional elevation of refrigeration chamber, arranged for nonreversible, cold-air circulation, showing discharge and suction ducts, false bulkheads, and tiers of sliding ports for controlling flow and direction of air.

The Fouling of Ships' Bottoms

Part II.—Some Notes on the Protective Coatings Used on Under-Water Bodies of Merchant Vessels

By E. Perry

IN Part I of this article on Fouling of Ships' Bottoms, we covered, in a general way, the nature and habits of vegetable and animal growths that attach themselves to ships in sea water. In this second part of the article we wish to present some general idea with regard to the present practice in composing and applying coatings for protection against these growths.

The practice of painting ships' bottoms has been in vogue so long that its value can hardly be questioned. The paint coating has been utilized as much or even more for the preservation of the wood or metal hull than for the prevention of marine growths. Thus, on steel vessels it is the custom to first cover the hull with a coat of "anticorrosive" paint and subsequently with a second coating of "antifouling" paint. The former is for the preservation of the metal, while the latter is applied in the hope of preventing the growth of fouling agencies, and so contains the various poisons for that purpose. That copper poisons are especially efficacious in preventing the attachment of the young larvae of marine borers is acknowledged generally. Copper and mercury salts are extremely toxic to most animal and plant organisms, and are conceded to be the most effective poisons to be utilized in antifouling compositions. That the efficacy of poisons has been doubted by many is indicated by the following quotation from the Royal Naval College of Great Britain:

"On examining the conditions under which a vessel is put when coated with a composition which relies for its antifouling powers on metallic poisons alone, we see at once the reasons which must make such a coating of little or no avail. In its composition are drastic mineral poisons—salts of copper, mercury, or arsenic—which have been worked into a paint by mixture with varnishes of varying kinds, and each particle of poison is protected from the action of sea water by being entirely coated with this mixture. As a rule, care is taken to select fairly good varnishes to resist the action of sea water, and it may be two or three months before they become sufficiently disintegrated to allow the sea water to dissolve any of the poison; whilst even with the accidental or intentional use of inferior varnishes three or four weeks will pass before any solution can take place and any poison liberated to attack the germs. A ship is dry-docked, cleaned, and her antifouling composition having been put on she goes probably into the basin to take on cargo. Here she is at rest and, with no skin friction or other disturbing causes to prevent it, a slimy deposit of dirt from the water takes place and this, as a rule, is rich in the ova and germs of all kinds of growth, whilst the poisons in the coating are locked up in their restraining varnish and thereby rendered inactive at the only period during which they could be of any effectiveness."

The U. S. Bureau of Fisheries learned this regarding the fouling organisms: "That all growths attaching to ships have a protective layer of material—frequently of a composition similar to limestone—between their bodies and the film of paint, and that in adult form food is taken in from a very considerable distance from the sides of the ship. It is apparent then that the only time a poison carried in a paint film could possibly be effective must be at the time of attachment. Barnacles (the most serious factor in fouling) attach by means of long antennae and they do not take any food or even have any functional mouth during the period of attachment, until metamorphosis has been completed. The effect of poison therefore must be either as a direct irritant during this process or else the poison must be in such concentration in the surrounding water that the little organism, after attachment and subsequent metamorphosis, is poisoned by it with the food it takes from a distance of at least 1 millimeter from the surface of the paint. The amount of poison necessary to build up a concentration sufficient to be toxic at so great a distance when submerged in an ocean of water that is usually in motion, and to hold such a concentration for a period of weeks or even months as is demanded, would probably need to be much greater than the amount used."

The antifouling properties of the general run of compositions is now usually limited to compounds of copper and/or mercury. Recommendations of the American Society for Testing Materials indicate that of all the different toxic substances tried, the most effective are the mercuric and cuprous oxides. Dr. Henry A. Gardner also reported that cuprous oxide (Cu_2O) is more efficient than cupric oxide (CuO), but that it should consist of at least 96 per cent. cuprous oxide. The quantity to be contained in each gallon of paint for varying service of ship has been determined per the following schedule:

	Ounces	
Service	Copper	Mercury
General	14	7
North temperate waters	25	1.5
South temperate waters	20	5
Tropical waters	14	14

The American Society for Testing Materials reports that differences in fouling and corrosion are as appreciable in under-water paints by varying the vehicle as they are by varying the pigment. This fact would indicate the relatively minor effect of the toxic agents, and the major importance of the condition of the paint coating. Essential requirements of bottom compositions, in addition to their specific functions, are that they may be applied rapidly and will dry rapidly. In many cases a vessel will go into dry dock, have the bottom cleaned and painted, and be out again the same day. It is desirable that the anticorrosive paint differ somewhat in color from the antifouling paint so that failure to properly coat any portions of the surface may be readily detected. Antifouling paints do not retain their protective properties indefinitely, hence the need for periodical repainting. In this connection, to obviate the piling up of paint coatings and also to facilitate the scraping down of vessel bottoms, a special form of paint was formulated termed "friable-type" copper paint.

The government's manual "Instructions for Painting Vessels of the United States Navy" says that "Antifouling paint deteriorates rapidly when exposed to air. Anticorrosive paint likewise deteriorates, but in less measure. Both, therefore, should be applied as late as possible before undocking." Further, "No vessel should be undocked without having been given a complete coat of antifouling paint just prior to undocking."

Good practice on steel ships is to apply one or two coats of anticorrosive paint from the keel to the deep-load line, one coat of antifouling paint from the keel to the light water-line, and a coat of boottopping from the light water-line to the deep-load line. On both steel and wooden ships there should be a first coat of priming paint. In the judgment of naval and marine engineers no other priming paint in the marine field has been as successful as a paint of pure red lead and pure linseed oil. No other paint produces such a hard tenacious coating. It stands high as regards impermeability, having a good thick coating with maximum pigmentation. Red lead and pure linseed oil paint does not contain anything soluble in water, and the paint dries hard throughout the thickness of its coating.

Since the major importance of the problem of fouling of ships' bottoms centers about the question of frictional resistance of the surface of the ship in passing through the water, the nature of the film covering this surface is of prime importance. One investigator maintains that the most effective coating for ships' bottoms so far as skin friction is concerned is a paint that offers a permanently hard smooth surface. It has been noted that fouling was most severe in regions where the surface was not smooth. In cases where the pigment of the paint had not been mixed properly before applying, the resulting rough surface was fouled more heavily than in regions where the paint offered a smooth surface. These observations are confirmed by reference to the report of Adamson in which he presented data to show that "the problem of fouling covers physical properties as well as chemical properties of the paint film."

It has been observed that fouling is most severe in the region of the run and beneath the bilge keels. That this increase in amount of fouling on lightly or moderately fouled ships in all areas that might be considered "shaded" was one of the most outstanding points noted during the whole of the Bureau of Fisheries investigation; more than 50 per cent. of all examinations showed such results very strikingly. The effect of light on fouling is a phase that offered considerable possibilities, and as no previous experimental data were available regarding it, considerable time was immediately devoted to its study. Without going into details on the various tests to determine the ultimate results, let it suffice that the manner of conducting those experiments was controlled along actual practical conditions in different territorial locations and by several reliable investigators already authorities on the general subject relating to the nature and extent of fouling of ships' bottoms.

The summary of these tests showed very conclusively that the darker the surface the more fouling was prevalent. The clean areas were most extensive (65 per cent.) on the white and (40 per cent.) on the yellow submerged plates. Bryozoa was most abundant on red plates (not even one specimen on the white, and only a few on the yellow plates); hydroids (grass) were absent from all but the red, blue, and black plates —abundant on the latter; barnacles were plentiful on blue and black; of course abundant on the black. This is in accord with the results found on the vessels themselves, the densest growths in regions least exposed to light, verifying as fact that most organisms commonly attached to the bottoms of ships become attached there because of the relative decrease in the amount of light given off by such areas. The larvae barnacles are sensitive to light and respond much more vigorously to light in the blue-green portion of the spectrum, than to light of other color (of course white excepted). Therefore, it became evident that paints varying from light blue to yellow would accumulate the least amount of fouling; and that a light green paint probably would be the most efficient. While a light surface is not by any means a cure-all, it will be recognized that anything which reduces the fouling 50 per cent.—as these extended tests seem to have accomplished—is a very important factor.

It would seem plain from the foregoing evidence that properly prepared paints of lighter colors than now in general usage is urgent. There is, of course, the matter of price to be considered, because practically all of the antifouling ingredients largely utilized in our present type paints are dark in color and less expensive than the materials available in limited variety to light color antifouling paints. However, the item of increased cost should not militate against adoption of more efficient paints when considered in comparison with the enormous losses to the shipping industry from delays, excessive fuel consumption, and other causes attributable to fouling.

(The End)

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A most amazing and useful compilation covering the whole range of the arts and industries and very carefully indexed for ready reference. Ten thousand, odd, selected household, workshop, and laboratory formulae. Trade secrets, chemical recipes, mechanical process, and money-saving ideas.

Six French Cargo Steamers

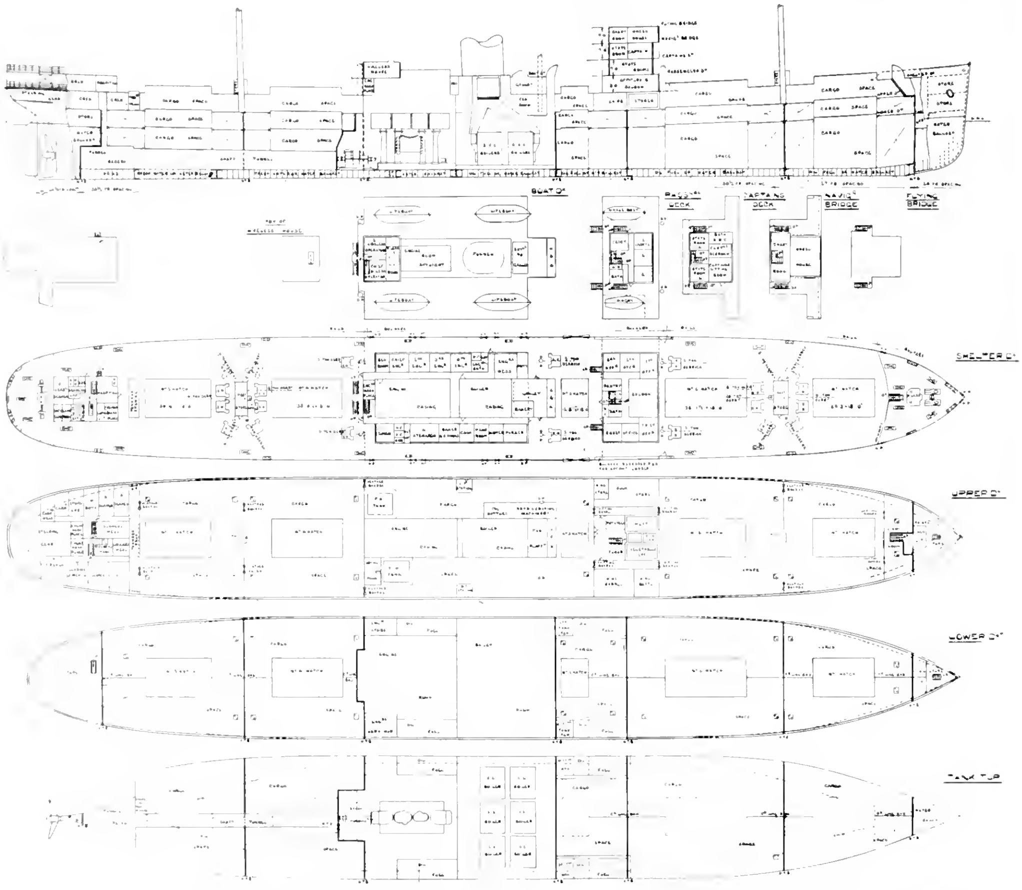
HARLAND and WOLFF have now completed at their Belfast shipyard the steamer San Pedro, last of six ships built for the Compagnie Generale Transatlantique, which company during the past few years has embarked upon a very ambitious building program resulting in the thorough modernization of its fleet. Like her sister ships, the San Pedro is a single-screw cargo vessel of open shelter-deck type with propelling machinery amidships. Her principal dimensions and particulars are:

Length between perpendiculars	430′ 0″
Beam	57′ 0″
Depth moulded	37′ 6″
Gross tonnage	5990
Deadweight, metric tons	8420
Horsepower	1600

This vessel and her sister ships have a service speed of about 13½ knots and a maximum trial trip speed of over 14 knots.

They have been built to the requirements of the highest class of the Bureau Veritas and to comply with the French, British, and International regulations regarding safety and hygiene. There are eight water-tight compartments, and the double bottom is arranged to carry oil fuel and water ballast. The cargo carrying arrangements are complete, there being five large hatchways fitted with steel hatch covers and worked by 22 steam winches. Arrangements are made for carrying grain in bulk. Accommodation of a superior type is provided for the officers, engineers, and crew; and a small number of passengers can also be carried. There are two tiers of tween decks, and in addition to carrying grain in bulk the ship is also able to carry large quantities of general cargo.

The San Pedro differs in her propelling machinery from the first five vessels, as an exhaust turbine of Bauer Wach type is incorporated with the main engine. This, it is anticipated, will result in a considerable increase in the over-all efficiency of the installation. The propelling machinery comprises a 4-cylinder,



Inboard profile and general arrangement plans of the six San Pedro class freighters of the Compagnie Generale Transatlantique.

One of the steamers of the San Pedro class on her trials at Belfast. One often hears marine engineers remark that the reciprocating steam engine is a "back number." Yet here are six first class new and modern freighters with 4-cylinder triples and Scotch marine boilers.

triple-expansion engine 31, 50, 60 and 60 inches cylinder bore, with a stroke of 60 inches. At normal service revolutions this engine will develop about 4600 indicated horsepower. The air, hot well, sanitary, bilge, and evaporator feed pumps are worked off the main engine by a lever attached to the low pressure crosshead. The remaining auxiliaries are separately driven and are of the latest type. Steam is generated in six single-ended cylindrical boilers designed for a working pressure of 205 pounds per square inch and burning oil fuel under forced draught.

Although the deck auxiliary machinery and the steering gear are steam driven, a great many of the engine room auxiliaries are electrically driven. Consequently the electric generating equipment is quite large for a ship of this type, and the load is taken care of by three vertical steam engines, each direct-coupled to a 12½-kilowatt generator set.

There is a complete system of loud speaking telephones and electric telegraphs from the navigating bridge to various parts of the ship, a powerful radio installation, a gyro compass of Brown type, and a Lux-Rich fire detecting and extinguishing apparatus. Four out of the six ships (the names of the others being San Antonio, San Diego, San Francisco, San Jose, and San Mateo) are fitted with refrigerated tween deck space maintained at the correct temperature for the carriage of fresh fruits by means of J. & E. Hall steam-driven refrigerating plants.

International Shipping Through the Dardanelles

By Francis M. Mansfield

AMERICAN shipping used the Dardanelles to the extent of nearly 500,000 tons in 1930, according to a report made by the Straits Commission to the League of Nations. Dues collected from all tonnage amounted to $350,000 in the year. A recommendation was made that dues, or tolls, should be reduced in all cases and abolished on vessels trading with Black Sea ports.

It was recommended also that adjustment of salvage dues for vessels in distress is likewise a matter for regulation. These dues are at present three times what they were in 1913 and "out of all proportion to the services rendered by the Turkish salvaging services."

The celebrated Soviet five-year plan has brought about increased traffic and dues unforeseen when the scale of taxes was first outlined. Since the dues assessed were never intended as a levy for profit but merely to cover the costs of compiling statistical records, it is obvious that a reduction is very much in order.

Traffic was 40 per cent. greater in 1930 than in 1929. This tonnage was attributed as follows:

Italy	4,551,000 tons
Great Britain	3,699,000 tons
Greece	3,400,000 tons
Norway	1,108,000 tons
France	889,000 tons
Germany	806,000 tons
Russia	612,000 tons
Holland	551,000 tons
Roumania	547,000 tons
United States	468,000 tons

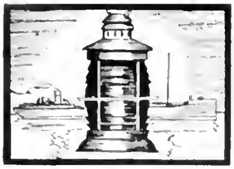
The report gave the first precise particulars on one delicate point which had been a choice morsel for sea-lawyers for some months past.

This referred to the composition of the Black Sea fleet of the Union of Soviet Republics; viz., one capital ship belonging to the Baltic fleet, stationed in the Black Sea since January, 1930, two cruisers (one of which also came from the Baltic), five torpedo boats, five submarines, four minesweepers, eleven patrol boats, two auxillary vessels, three training ships, and twenty-one training hydroplanes.

With reference to the passing of two Russian naval vessels through the Straits from the Black Sea en route to the Baltic, the report states that it was "quite in accordance with the provisions of the Convention relating to the Straits regime."

The issue involved herein is that of freedom of the Straits for merchant ships and civilian air craft in times of peace. This was achieved as one of the items in the bill presented to Turkey at Lausanne, and Turkey paid by opening Hellespont of the ancients, the classic waterway from the Mediterranean to the Black Sea, to the shipping of the world.

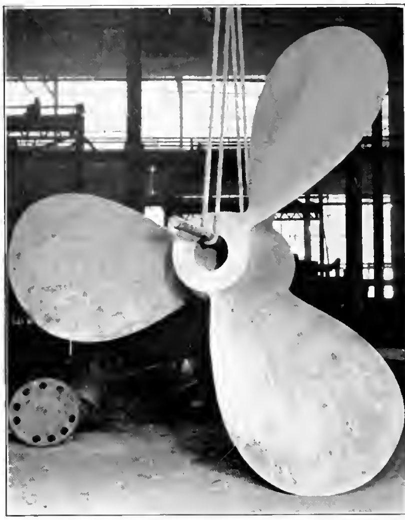
Furthermore in time of war the Treaty sets forth that merchant ships might pass if belonging to a neutral state, but only at their own "risks and peril".



Marine Equipment

LARGE PROPELLERS ~ ELECTRIC YACHT DRIVE
DIESEL POWERED CRUISER ~ CARGO WINCHES

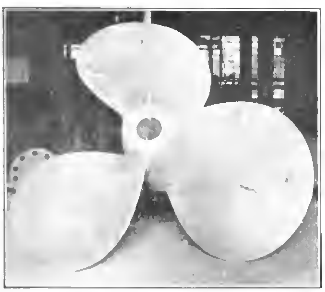
Atlantic Coast Foundry Busy on Large Propellers



One of the solid Parsons manganese bronze propellers for the Matson-Oceanic liner Mariposa, 18 feet diameter, 19 feet 6 inches pitch, weight 31,800 pounds.

During the past few months the Cramp Brass and Iron Foundries Company of Philadelphia has booked orders for more than 1,800,000 pounds of Parsons manganese bronze propeller wheels to be used on vessels now under construction in Atlantic Coast shipyards. These wheels are being ordered for practically all of the merchant vessels now building with the assistance of federal loans under the Jones-White Act and also on many United States Navy cruisers and other government vessels. The aggregate of these orders is larger than any placed in America since the close of the war-time shipbuilding program.

Included in these wheels are the propellers for three new liners for the San Francisco-Australia service of the Matson-Oceanic Line now building at the Fore River Plant of the Bethlehem Shipbuilding Corporation, Ltd., and also the order for the wheels for the two new United States Lines steamers building at the New York Shipbuilding Company plant, Camden, New Jersey. These latter are said to be the heaviest propellers ever cast in the United States, the castings weighing approximately 47,000 pounds each.



Parsons manganese bronze propeller for 10,000-ton cruiser, 12 feet diameter, 11 feet 9 inches pitch, weight 15,800 pounds.

This foundry has also recently completed an order for Parsons manganese bronze valve castings for the American Locomotive Company to be used in the construction of a new water supply system for the City of New York.

In addition to this large volume of marine work, the Cramp Foundries are furnishing a very considerable tonnage of nonferrous castings to the general industrial trade. On the iron foundry side, the plant is particularly adapted to the production of high grade castings for water turbines and other heavy machinery. Two $1\frac{1}{2}$-ton electromelt furnaces are employed in this production of high grade electric furnace iron and the Cramp copyrighted Elfur metal.

The Cramp Brass and Iron Foundries Company is American manufacturer and distributor of the famous Parsons bronzes and Parsons white brass. It is represented on the Pacific Coast by its affiliates, the Pelton Water Wheel Company of San Francisco, for whom C. V. Lane of San Francisco is handling marine sales.

Bronze evaporator shell for 10,000-ton cruiser, 68 inches diameter and height, 5/8-inch walls.

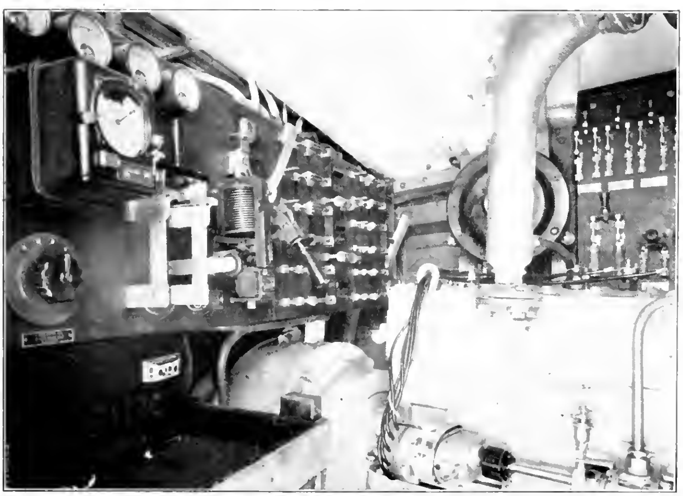
Electric Auxiliary Drive for Yacht Mahdee

A DIMINUTIVE example of electric ship propulsion, driven by a 25-horsepower motor, was launched April 4 by G. Frank Lawson of Dorchester, Massachusetts, and was maneuvered back to the dock under her own power. This was the 53-foot auxiliary sailing schooner yacht constructed for Alexander W. Moffat, vice-president of Walter Baker & Company. The yacht is equipped by the General Electric Company with gas-electric drive for use when becalmed. Such auxiliary propulsion is usually of the direct or geared gas engine type.


Looking down through the hatchway at the 25-horsepower General-Electric motor on the Mahdee.

Although the gasoline engine was not started at the time of launching, and although the storage batteries with which the yacht is equipped were almost exhausted, the batteries were still able to deliver enough power to run the propulsion motor. Mr. Moffat was at the wheel at the time of the launching and was able to bring the craft to the dock satisfactorily.

The yacht has a 14½-foot beam and a 6-foot draft. The power plant consists of two Winton model W2, 6-cylinder, 4-cycle, 1400-revolutions per minute gasoline engines each direct connected to a 10-kilowatt electric generator which supplies power for emergency propulsion, lighting, and the operation of auxiliaries. The storage battery installation is of Exide manufacture and is used as an additional source of power for lighting, auxiliaries, and starting the engines. These batteries will be charged by the gasoline-electric power plant when necessary.


View in the engine room of the Mahdee showing one of the 10-kilowatt Winton-General Electric generating sets and the switchboard.

The single propeller is direct-connected to a 25-horsepower, 575-revolutions per minute, shunt wound, direct current motor. Armature control is used, a drum controller being located inside the steering gear housing within easy reach of the skipper of the craft.

American Insulation on Japanese Liners

THE nine new motorships recently built in Japan and added to the Nippon Yusen Kaisha fleet are splendid examples of modern, efficient naval architecture and marine engineering. The largest and the best known of these ships are the three beautiful passenger liners Chichibu Maru, Tatsuta Maru, and Asama Maru of the Orient-California Line.

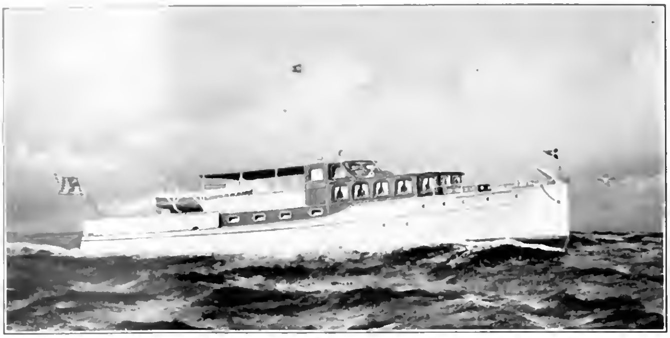
Four of the nine ships are powered with Burmeister & Wain diesels, and five with Sulzer diesels.

The insulation of a diesel exhaust line calls for a material which has all the attributes of a good pipe covering in addition to the ability to withstand the intense heat generated. It must be immune to vibration, it must be highly efficient with the minimum of thickness, and it must be proof against calcination.

The N. Y. K. engineers ordered, through the Chitose Trading Co., of Tokyo, who represent Johns-Manville in Japan, the necessary J-M Superex Block, sponge felted sheets and 450 and 302 cement to insulate the main engine exhausts on seven of the nine ships and the auxiliary engine exhausts on six. On every one of the nine ships some J-M insulation is playing an important part. The 302 cement is used as a finish over the Superex Blocks, and the 450 cement is used on the exhaust silencers. J-M sponge felted sheets is used over the Superex Block in certain places.

There are hundreds of instances of Johns-Manville insulation on diesel engine exhaust and auxiliary lines both afloat and ashore, but the N. Y. K. installation, wherein J-M insulation is used on every one of nine new ships, is one of which that firm is particularly proud.

Diesel-Powered, Eighty-Foot Express Cruiser



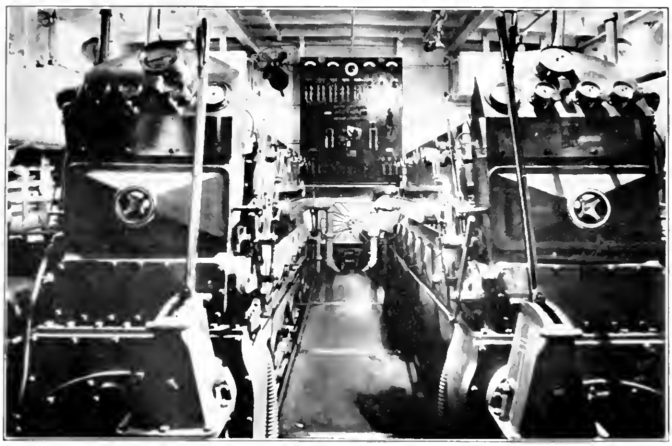
Diesel cruiser All Alone.

ONE of the most remarkable of the newer diesel yachts is the All Alone, an 80-footer which the Mathis Yacht Building Company recently completed for George W. Codrington, president, Winton Engine Corporation. This handsome boat, powered by twin Winton diesels, will do 20 miles an hour, and has attracted much attention because of her lines, general arrangement, and sea ability.

With diesel-powered boats turning up such a speed as this, it is small wonder that diesel engines are now being installed in a great many boats heretofore considered unsuitable for diesel applications. All Alone is a remarkable boat, too, because of her steadiness and easy maneuverability. The yacht has an over-all length of 80 feet; beam over planking, 15 feet; draft, 4 feet, 6 inches. Construction of hull follows the general practice of express cruiser construction, with double planking, steam bent oak framing, oak keel, stem and deadwood. Special attention was given to engine girders and web frames in engine room. Built-up steel fore and aft girders 48 feet long were run inboard and outboard of motors in connection with four steel belt frames in way of motors and steel bulkheads at each end of engine room. This construction, in combination with the splendidly balanced Winton diesel engines, give a result never before obtained in a diesel-powered express cruiser.

Her accommodations in owner's quarters, which are located aft, consist of two very large and well ventilated staterooms and two bathrooms. The dining room with entrance from the bridge deck is also exceptionally large, measuring 17 feet by 12 feet. The quarters aft are finished in ivory white paneling and mahogany furniture, and the dining room is finished in American walnut. The galley and crew's quarters are located forward, with forecastle accommodating four men and a large stateroom under the dining room for the captain and engineer.

The engine room is exceptionally well laid out. The main engines are two special 6-cylinder, 8 by 10-inch airless-injection Winton diesels, developing 300 horsepower each. The mechanical equipment, in addition to the main engines, consists of two 5-kilowatt Winton generating sets, two 3-horsepower electric-driven air compressors, separate electric-driven fire and bilge pump, pressure water supply system, Frigidaire refrigerating plant, air tanks for starting and reversing main motors, and all necessary fuel transfer pumps and water circulating pumps. The exhaust from the main engines is carried to the stern through water-jacketed pipes in the engine room and from there to the transom through special rubber exhaust pipes. Fuel oil capacity of 1000 gallons, carried in two welded steel tanks located in forward end of engine room, gives a cruising radius of 1000 miles.



The two 6-cylinder, airless injection, 300-horsepower Winton diesel engines in the engine room of the All Alone.

A special feature is her exceptionally large bridge deck, measuring 17 feet fore and aft and running the full width of raised deck. The forward part of the bridge is enclosed with plate glass windows giving a protected observation deck. On the after trunk cabin she carries a 14 foot power launch and a 10 foot dinghy. Deckhouse, trunk cabins, and all outside trim are teak.

The performance of this cruiser shows that you can get speed along with the other advantages of diesel power when your boat is competently built and powered.

The new type Winton diesel engines and Winton gasoline engines are very popular among American yacht and motorboat owners because of their trim appearance, sturdy dependableness, light weight, low fuel consumption, conservative rating, and economy in maintenance. These engines are available for a wide range of capacities and applications.

Evolution of the Electric Winch

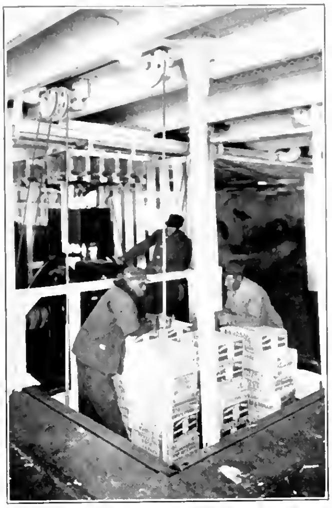
(Continued from Page 233)

ally assigned to winch equipment.

The tanker J. W. Van Dyke (1925) has 4 wormgeared winches on which nigger-head operation only is possible, the winch being nonoverhauling and the motor nonreversing. Since the motor is in continuous operation, hoisting of the load is effected by means of several turns of rope around the nigger-head, the loose end of the rope being pulled by the operator. In the reverse fashion, the load can be lowered by a slackening of the tension at the loose end of the rope. Cargo is generally handled by dock winches in this way although not with the same type of equipment; also the Holland - America Line finds this method of cargo handling advantageous. Small fish hoists for trawlers are made in exactly this same style. The J. W. Van Dyke installation is the last of this type that Westinghouse has equipped.

The Clyde Line, although operating both steam and electric cargo winches, has repeatedly purchased equipment for five ships until now they have fifty Westinghouse-equipped winches in regular operation.

Four "blind" hatches and one open hatch at tween decks are operated by 27 horsepower motors with cam controllers, separately mounted resistors, suspended from the deck over the winches and separately mounted protective panels located on partition at rear of space allotted for the winches. The crane circuit is used. In addition to the ordinary overload protection, the protective panels have the jamming relays. This extra step-back feature has never been used in connection with this sort of service subsequent to the Clyde Line installations.



Freight elevator for 'tween deck service, side port delivery, on an Old Dominion Line steamer.

Cargo winches on the motorship City of Elwood, showing neat, elevated platform and enclosed deckhouse for resistors and contacts.

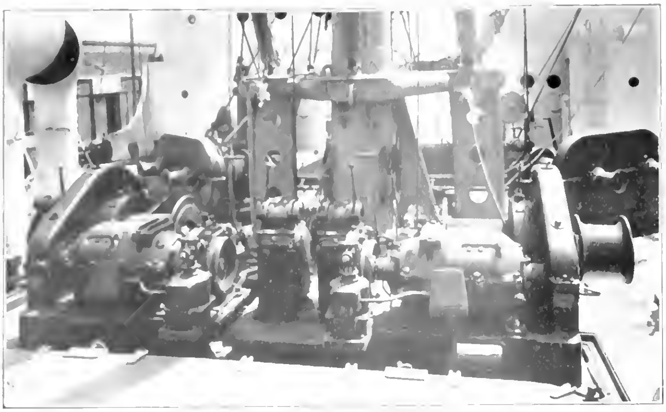
The use of side ports in connection with the operation of tween deck winches facilitates the handling of package freight. The Old Dominion Steamship Co. is a believer in this method of operation. However, in 1924, two of its vessels, the George Washington and the Robert E. Lee, were equipped with platform hoists.

The material is moved by hand trucks from the wharf to the vessel, or vice versa, through the side ports. The rolling of the trucks onto the platform and the piling of the packages on same constitute the first steps in the operation. The platform is then lowered to the deck intended for discharging, and the gang below receives and stows the material. The location of such a hoist is tween decks at a "blind" hatch. Protection from the weather is assured both for the cargo and the electric equipment used to drive the winch.

The platform, which is supported by four steel hoisting cables, has no side protection. The hoisting cables pass from the support of the lift over "fleeting" sheaves to the grooved winding drum on the winch. The platform weighs about 1000 pounds, and the useful load can be as great as 3 tons. The men, who may or may not ride on the platform, are cognizant of the conditions under which they work, so that this method of cargo handling is entirely safe. Manual type control equipment of the simplest construction is used. The protective panel is mounted in a suitable cabinet. Open resistors are mounted under the deck just above the winch parts.

Over-travel limit switches are a necessary part of hoisting equipment of this kind, particularly for the lower limits which the operator cannot see, and which when reached cause slack cable with its attendant troubles or uneven winding on the drum. Excessive over-travel in the upward direction, if not cared for by the limit switch, would cause the breaking of cable or winch parts. A simple means for the resetting of the limit switches, when opened, is the temporary depression of a push button until the normal hoisting or lowering operation is again established.

On account of the extra labor involved for hand trucking, the handling of cargo through side ports is relatively more costly than that by the fixed boom and burtoning meth-



Installation of friction drum winches on a Ward liner.

ods. However, on short runs having intermediate stops, with special sorting and stowing of the commodities, conditions for which it is best fitted, the cargo hoist has found favor in the past. The Old Dominion, the Atlantic Gulf and West Indies, and the Eastern Steamship Lines furnish examples of cargo handling entirely or in part by means of platform hoists.

The United States Shipping Board has been a large purchaser of electric cargo winches. The Board cooperates with the Westinghouse company extensively to produce simple, fool proof, electrical equipment and to furnish adequate protection of same, so that electric parts, wherever possible, were removed from the direct action of the elements.

The Shipping Board had two conversion programs, the first of which brought forth the snap-action type of switch on Westinghouse cam controllers (this represented development along mechanical lines), and the second of which furnished the initiative for the development of the so-called "hi-speed" circuit by E. M. Claytor, sometimes known as the "Claytor circuit." Considerable forethought was exercised in furnishing a spacious deck house for electrical equipment, also work bench, and in the provision for platforms extending outward as near to the hatch openings as possible. For these vessels 25-horsepower motors were supplied throughout. Two vessels were equipped with magnetic type controllers and seventeen vessels with manual type cam operated controllers having remote operation by means of levers and operating stands. Of the manually operated controllers, eight ships were equipped with standard type "S" cam and the remainder with the snap-action type.

Following the "hi-speed Claytor circuit" installations on the Shipping Board conversion program, much favorable comment was made, and similar equipments were purchased by the Alaska Steamship Company and the American South African Lines. This "hi-speed" circuit is briefly described as follows:

When hoisting heavy loads, the shunt winding is over-excited for its force adds to the force of the series winding with the result that very great torque is produced.

When hoisting light loads, the control system reduces the force of the shunt winding to a small value, so that in fact the motor is changed into a series motor with a higher speed rating. This actually causes the empty hook and light loads to be lifted faster than is possible with a standard series motor of the same full load speed and horsepower rating.

In lowering the empty hook the motor is accelerated first with the series winding active, until approximately half speed is reached, then the armature is brought up to full speed as a shunt motor, the series winding having been short-circuited.

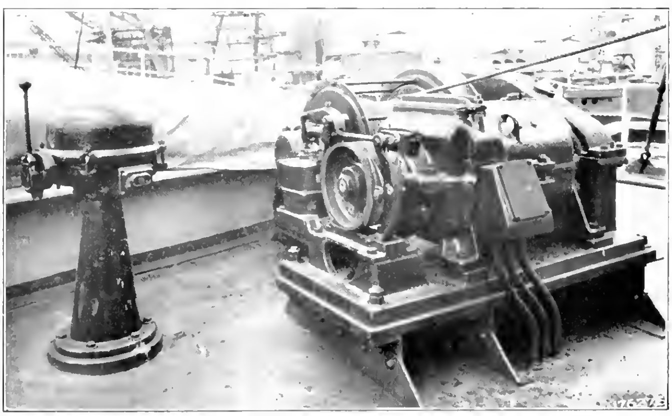
It is well-known that a shunt motor will not lose speed when extra friction is encountered, but will adjust its torque by drawing more current from the line at the same speed. Thus, we have found a cure for the sluggish, lazy action observed in cold weather for conditions of lowering the empty hook.

The lowering of the heavy loads is accomplished by automatically strengthening the force of the shunt field winding. The motor is turned into a shunt generator and gives regenerative braking which returns power to the supply line.

This performance is obtained on the last point of the controller for hoisting and lowering. Other points give slower speeds.

It is important to note that the "hi-speed" circuit can be offered with either the manual or the magnetic type of control equipment.

Without the aid of any device, other than the ordinary controller handle, the "hi-speed" circuit will give the following outstanding performance.



Electric winch as installed on Shipping Board motorships Triumph and Defiance.

1. Acceleration of the motor at no-load to full load speed in either direction of rotation in less than four seconds.

2. The empty hook lowering speed is at least equal to greater than that for hoisting the empty hook.

3. The speed of lowering the empty hook is capable of adjustment without affecting the hoisting speed of same.

4. The speed of hoisting the hook is capable of adjustment without affecting the lowering speed of same.

5. The hoisting or lowering empty hook speed is not less than 2½ times the full load hoisting speed.

6. On the last lowering point of the controller, current is returned to the line for all loads in excess of the winch, sheave, and line friction.

One of the more recent installations of the magnetic crane-type circuit is the 24 winches on the diesel-electric propelled freighters Triumph and Defiance. These are 25-horsepower units, with a motor speed of 520 revolutions per minute.

In connection with the winch installation on the motorship City of New York, the combination of the snap-action cam-operated controllers with water-tight cabinets was made for the first time. In addition to this, the "hi-speed" circuit is employed. Two sizes of motors, 30 and 25 horsepower, respectively, are used. The large double-geared winches have load combinations of 4700 pounds at 170 feet per minute and 10,000 pounds at 80 feet per minute. The single geared smaller equipments lift normally 4000 pounds at 185 feet per minute. Suitable protection is afforded in deck houses at the base of the mast and other locations on the upper decks for the winch resistors and protective panels.

On the Alaska Steamship Co.'s steamship Aleutian, 40-horsepower slow speed motors are used in connection with the magnetic type of "hi-speed" control for the operation of the heavy duty cargo winches.

On two of the Ward Line steamers, "CK" slow-speed motors, at 25 and 35 horsepower, respectively, are used in connection with water-tight cam nonreversing controllers and suitable solenoid brakes to drive friction drum winches which are in popular use on the "Agwi" Lines.

Hoisting with this class of equipment is accomplished (with the clutch engaged) in the regular way of all winches. However, after the hoisting operation is finished, the load is lowered by gravity, the downward motion being checked by means of a suitable mechanical brake or slipping the clutch. In the ordinary reversing "keyed drum" type of winch, the safety of lowering is inherent in the motor, the controller, and the solenoid brake; whereas for the friction drum type of equipment, mechanical appliances are used to control the load or the empty hook in lowering.

Winches having a hook speed of 600 feet per minute with a sling load of 1800 pounds, the fastest ever built, are now being manufactured for the three new palatial liners for the Matson Navigation Company. Westinghouse engineers have worked out a magnetic crane circuit for these 30 equipments in conjunction with Allan Cunningham of Seattle, who is building the single-geared winches. Twenty equipments of the same rating are also building for Dollar Steamship Line. These will be used with Lidgerwood single-geared winches having a rope speed loaded of 350 feet per minute.

For 8000- and 6000-pound maximum winch duty on the steamship Borinquen of the New York & Porto Rico Steamship Line, four 35-horsepower motors, 355 revolutions per minute, and six 25-horsepower motors 675 revolutions per minute are used. The winches on this vessel require reversing control equipment for the crane circuit. Cam water-tight controllers are used with suitable protection for the drip-proof protective panels and open type sherardized resistors. Solenoid brakes for the motors are also a part of this type of equipment.

For the United States Lines, two vessels, 40 motors, of 35 horsepower are used to drive 3- and 4-ton winches by means of the magnetic "hi-speed" control circuit. The controllers will be of the open type mounted in a protected location, the master switches being water-tight. For the hoisting of provisions two winches driven by 13-horsepower, 7-CK motors are operated under the magnetic crane circuit and are rated at one-ton capacity.

A very fine example of the CK motor with the "hi-speed" circuit, using the double-geared winch, is found in the equipment now being installed on Henry Ford's vessel Osweya.

With the past ten years having brought the electric deck winch to its present almost perfect status, it would be difficult to predict what will be considered the last word in this type of equipment, say in 1941.

Trade Literature

Pioneer & Consolidated Marine Instruments.—The Pioneer Instrument Company, according to a recent, very attractively printed booklet and catalog, is a division of the Bendix Aviation Corporation and is the largest organization in the world devoted exclusively to the manufacture of marine and aircraft instruments. The Pioneer Instrument Company recently acquired by merger the Consolidated Instrument Company of America. The combined products of the new organization are effectively displayed and described in this bulletin, which we will gladly supply on requests to the Editorial Department of this magazine.

Worthington Pump & Machinery Corp., Harrison, N. J., has available for distribution a catalog describing and illustrating the **Surface Condenser**, patented folded tube layer type, for turbo-generator with turbine-driven circulating pump, steam-air ejector as air removal apparatus, and motor-driven hotwell pumps. (W-200-S10).

Buoyage System of the United States is the title of a pamphlet recently published by the Lighthouse Service of the U. S. Department of Commerce, describing the function of the buoyage system of the United States and its relation to safe navigation.

Port of Seattle Yearbook, 1931, has been published in its usual attractive form by the Port of Seattle Commission, with headquarters at the Bell Street Terminal. The publication has a beautiful frontispiece in colors entitled "The Spirit of Transportation" depicting a modern air liner flying over the clouds, with the peak of Mt. Rainier showing above the floor of the clouds. The port and the city are beautifully illustrated in this booklet and the harbor, its facilities, and its back country and industries all receive their due share of attention, in addition to the usual annual statistics.

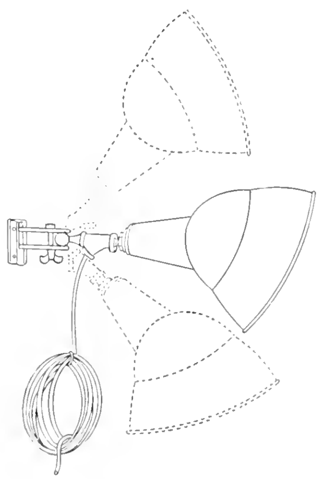
A New Cargo Light Fixture

ADEQUATE lighting of cargo holds for stevedoring operations has long been a problem in cargo handling. Captain N. J. Kane, port superintendent for the American - Hawaiian Steamship Company at San Francisco, after giving this problem considerable thought, devised an adjustable ball socket fixture and a plate for holding the same, and gave the new device a thorough try-out on one of the company's intercoastal cargo vessels.

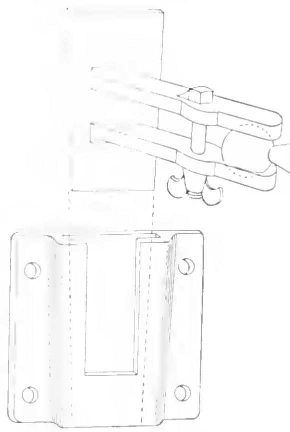
The results of this test were so gratifying that the American-Hawaiian vessels were all equipped with these cargo reflector holders. There ensued rather remarkable reduction in claims for damage, in lamp breakage, and in lost time accidents. At the same time the stevedoring operations were speeded up and the efficiency increased.

The fixture and its record were submitted to the committees of the Accident Prevention Department of the Pacific American Steamship Association, the Shipowners Association of the Pacific Coast, and the Waterfront Employers' Union at San Francisco, who, after careful consideration, gave the device their unqualified approval.

As will be noted in the illustrations, this fixture is a very rugged, simple device, easily adjustable by any one. The ball and socket are so designed that when attached to a column the reflector can be swung through almost 360 degrees and the light be applied to any corner of the hold from one position. The plate for holding the socket is a very simple and effective holder. The socket is adaptable to any style of reflector.



The Kane fixture with cargo flood light in place.



Kane fixture for holding cargo flood lights.

This fixture, on which application has been made for patent rights, is now being manufactured and distributed by the United Shipsmithing Company of San Francisco, for whom James J. Lankin is in charge of sales.

Protection Against Tank Corrosion

PROTECTING the steel tanks of tankers against the destructive action of certain crude petroleums and of benzene, gasoline, and other light distillates of petroleum has long been an interesting and a baffling problem to the operators of tankers and the chemical technicians of Europe and America. It is now reported that the chemical staff of the International Paint and Compositions Company of London have solved this problem by the introduction of a new compound which has been named Tanctectol.

Experiments with this material show results which have justified the principal oil companies and tank ship owners in Europe in the final decision to use Tanctectol on all surfaces exposed to oil cargoes on vessels carrying the lighter distillates, gasoline, or benzene. Eight new vessels now under construction in England are being painted with Tanctectol, as well as a larger number on the Continent. Many Norwegian owners have adopted this new method of tanker protection.

Tanctectol is in the form of a paint with average paint consistency. It has excellent adhesive properties and dries in less than one half hour; so that several coats can be applied in one day. Care should be taken to apply the first coat of Tanctectol directly to the true surface of the steel. In the cargo tanks of vessels which already have carried oil cargoes, the steel surface should be thoroughly scaled or sand-blasted and cleaned and dried before applying this new paint. Two coats are recommended as standard practice.

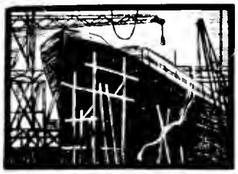
Tanctectol is insoluble in gasoline, benzene, benzol, or any other hydrocarbon. It is not affected by water, fresh or salt. It is proof against sulphuric, sulphurous, or any other acid naturally found in crude oil or its distillates. It has great resistance to electrolysis and to the action of hydrogen sulphide gas.

The protection of cargo tanks by this impervious coating will eliminate the necessity of the present practice of using tankers alternately for light and heavy oils, since a tanker so protected may carry light oil cargoes year in and year out without damage. It will also eliminate the expense of periodic internal cleaning and frequent repairs due to corrosion damage.

At the present time when considerable tanker tonnage is laid up, it would be possible to effect this protection in a leisurely manner at least expense for labor and for lost time of vessels.

The International Compositions Company of New York owns the American manufacturing rights for Tanctectol. This firm is represented in California by C. G. Clinch and Company of San Francisco and San Pedro; in Oregon by F. C. Hagemann of Portland; and in Washington by W. H. Pierson Company of Seattle.

Ni-Resist (Bulletin No. 208) is a new booklet issued by The International Nickel Co., Inc., 67 Wall St., New York. Ni-Resist is a special type of alloyed cast iron which is serving many useful purposes in the chemical and allied industries and presents improved resistance to many acid and alkaline solutions.



American Shipbuilding

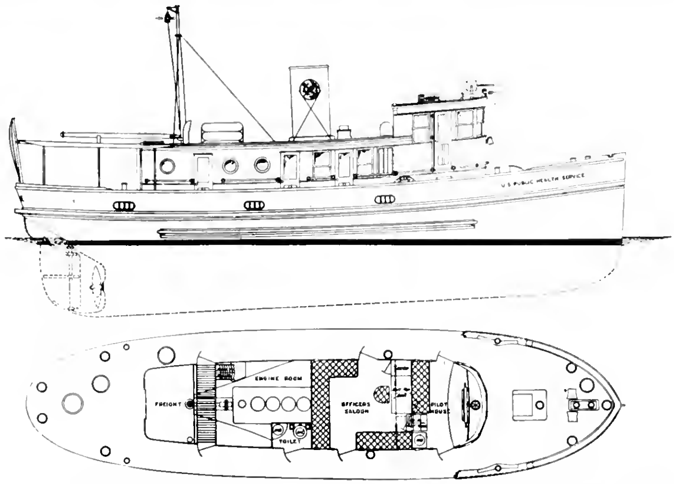
Edited by H. C. McKinnon

Seattle Yard Gets Alaska Boat.—The Berg Shipbuilding Co., 28th Avenue, N. W., Seattle, Wash., has been awarded contract for the construction of the wooden service vessel for the Bureau of Indian Affairs, Department of Interior. The vessel is intended for service to the coastal government stations in Alaska to replace the steamer Boxer. J. R. Ummel, office manager and purchasing agent for the Department of Interior, Seattle, Wash., will supervise the construction. W. C. Nickum of Seattle is the naval architect who designed the vessel.

Of heavy wooden construction to withstand ice conditions in the northern waters, the new vessel will be 225 ft. length over-all, 210 ft. between perpendiculars, 41 ft. molded beam, 42 ft. extreme beam, 21 ft. 6 in. molded depth, and 16 ft. loaded draft. She will have one propeller driven by a 1500 horsepower McIntosh & Seymour diesel engine. Accommodations will be provided for 22 passengers in first class and 20 in steerage.

All auxiliaries are to be electrically operated. Fuel capacity will be sufficient for a cruising radius of 10,000 miles and she will have general cargo capacity for 1500 tons and 16,000 cubic feet of refrigerated holds.

Eight Pacific Coast shipyards submitted tenders on this vessel. Alternate bids were asked on 1200 brake horsepower and 1500 brake horsepower diesel power plants and on 1200 and 1500 brake horsepower, respectively, diesel-electric units. This gave a wide range for the selection of power units and bids included practically every type of American diesel. The Berg Shipbuilding Company was low bidder for the vessel equipped with a 1500 brake horsepower McIntosh & Seymour trunk piston type engine, $383,390.60; and for 1200 brake horsepower engines: Busch-Sulzer cross-head type engine, $383,003; De La Vergne trunk-piston type, $379,909.60; Bessemer trunk-piston, $375,100.50; Washington, trunk piston. $382,454.



Outboard profile and deck plan of boarding tug for Quarantine Division, U. S. Health Service, building by General Engineering & Drydock Company.

Contract Awarded for Derrick Barges.—The Willamette Iron & Steel Works, Portland, Ore., has been awarded contract by the U. S. Army Engineers for the construction of four derrick barges for use on the Columbia River. The bid for the barges was $4525 each and they will have dimensions of 50 by 22 by 3 ft.

Two Self-Propelled Suction Dredges Ordered.—Dravo Contracting Company, Pittsburgh, Pa., has been awarded contract on a low bid of $904,864 for the construction of two self-propelled, steel-hull, steam-powered suction dredges for the U. S. Engineers' Office, Memphis, Tenn. The dredges will be 214 ft. long, 46 ft. beam, 9 ft. depth, 5 ft. draft. Each dredge will be powered by two triple expansion, vertical, reciprocating engines developing a total of 1200 horsepower and each dredge is to be powered with geared turbine dredge pumps of 1250 normal brake horsepower. They will be equipped for 32-inch discharge.

This yard also has an order from the American Dredging Co. of Philadelphia for ten steel dump scows.

Steam Tug Ordered.—The Great Lakes Engineering Works, River Rouge, Michigan, has an order from the Dunbar & Sullivan Dredging Co., for a steam engine powered tugboat to be 90 ft. between perpendiculars, 24 ft. 6 in. beam, and 13 ft. loaded draft. The engines will develop 750 indicated horsepower and the tug will have a speed of 12 miles an hour.

Steel Hull Ferry Ordered.—The Pusey & Jones Corp., Wilmington, Del., has an order from the Wilson Line, Inc., Wilmington, Del., for the construction of steel hull and steel superstructure for an automobile carrying ferryboat. The owner will supply the diesel machinery and do other work. The craft is to be 206 ft. long, 58 ft. beam, 16 ft. depth, with carrying capacity of 75 automobiles. The cost is said to be $350,000.

This yard also has an order from the same owners for the practical rebuilding of the ferryboat City of Washington, damaged by fire. Work will consist of entirely rebuilding from the main deck up, three decks to be added above the main deck.

United to Build Three Truss-Weld Barges.—Contracts for construction of three all-welded Truss-Weld hulls an oil towing barge and two derrick barges have been awarded to United Dry Docks, Inc. by the Atlantic Gulf and Pacific Company, engineers and contractors.

The oil barge already is under construction at United's Staten Island Plant, and will be launched early in June.

Ferryboats to be Launched.—The two as yet unnamed New York City ferryboats being built by the Tebo Yacht Basin of the Todd Shipyards in Brooklyn were launched the latter part of May with steam up and completely ready for service. These boats are of the 151-ft. type, and will add inmeasurably to the facilities of the Department of Plant & Structures for handling the increasing traffic.

They are 151 ft. in length, 53 ft. breadth, and 14 ft. 3 in. in depth. The hulls are divided into seven water-tight compartments. The propelling machinery consists of two vertical compound, surface condensing steam engines, built by the Todd Dry Dock Engineering and Repair Corporation, coupled together on one shaft with a screw propeller at each end. The vessels will also be equipped with the Todd system of oil burning under boilers.

Tuna Fisher Building at San Francisco.—The Genoa Boat Building Co., located at Fisherman's Wharf, San Francisco, has an order from Gaetano Cresci and Nick Cola for a tuna fishing vessel to be 91 ft. long, 23 ft. beam, and 10 ft. draft. The boat is to be of wooden construction and powered with a 300 horsepower Western-Enterprise diesel engine supplied by the Western Machinery Company, San Francisco. The boatyard is operated by Joseph Baviacqua and the fishermen ordering the boat are well known operators out of San Diego and Monterey.

Repairs to Lighthouse Tender.—Commercial Iron Works, Portland, Ore., has been awarded contract for installing new fire boxes in the U. S. Lighthouse tender Heather. This yard also received contract for deck structures, repairs, and dry-docking.

Tanker Reconditioned. — The Craig Shipbuilding Company, Long beach [illegible] completed reconditioning [illegible] American tank steamer [illegible] DeGolia, ex William [illegible] by the Hillcome Steam [illegible] ny. The vessel was given [illegible] after steel deck, officers [illegible] quarters were rearranged [illegible] r repairs totaled $23,000.

Fire Damages Boatyard. — The busy yard of the Barbee Drydock and Shipbuilding Co., 26th Ave., N. W., Seattle, Wash., was damaged to the extent of $30,000 the latter part of April. This yard is busily engaged in building fishing craft for various owners. The 56-ft., Washington diesel engine powered, purse seiner, Governor Hartley was launched from the yard recently.

One of the most important jobs turned out by this plant recently is the rebuilt and equipped ferryboat Ballard, formerly the Liberty, for the new Ballard-Ludlow Ferry Company, Captain J. Howard Payne, president. The vessel is equipped with a new 650-horsepower Washington diesel engine. The hull was rebuilt to provide capacity for 40 automobiles on the main deck and accommodations for 400 passengers on the upper deck, with dining room and lunch counter.

The owners anticipate that the Ballard-Port Ludlow route will necessitate the construction of an additional ferryboat next fall.

Tuna Boat to be Launched.—The Campbell Machine Company of San Diego has scheduled the launching of the fine new tuna clipper Mayflower for June 16. The Mayflower is 135 ft. long and is to be powered with a 500-horsepower Union diesel engine. She is building for S. J. Inos and J. and M. Medina.

Lighthouse Tender Ordered. — Hampton Roads Shipbuilding Co., Portsmouth, Va., has received contract from the U. S. Bureau of Lighthouses for the construction of a new tender of the Violet class on its bid of $339,000 and delivery in 390 days. The new tender is to be named Lilac and will be 170 ft. length over-all, 32 ft. molded beam, 13 ft. molded depth, 8 ft. 6 in. draft.

Steel Carfloats Ordered—The McClintic-Marshal Company, Pittsburgh, Pa., has an order from the Inland Waterways Corp., Washington, D.C., for two new steel carfloats, having submitted low bid of $163,365.

Submits Low Bid for Quarantine Tug. — **Spedden Shipbuilding Co.,** Baltimore, Md., was low bidder April 22 for the construction of a diesel-electric powered quarantine tug for the U. S. Public Health Service, Staten Island, N.Y. The tug will be 100 ft. length, 23 ft. beam, 11 ft. depth. Under this bid the power plant will consist of two 325-horsepower Fairbanks-Morse diesel engine propulsion units, with pilot house control.

President Hoover Sea Trials June 16.—Sea trials of the new Dollar liner President Hoover, now nearing completion at the Newport News Shipbuilding & Drydock Co., will be started June 16 and will last three or four days. They will include runs over the measured mile off Rockland, Me., for standardization of the screws, and a 24-hour under way trial at sea. The turbo-electric power plant has been supplied by the General Electric Company.

The President Hoover is scheduled to sail from New York August 6; and on August 24 will sail on her maiden transpacific voyage from San Francisco carrying a large trade delegation to ports of Hawaii, Japan, China and the Philippines.

In order to provide adequate home port docking and cargo and passenger facilities for the new steamers, the Board of State Harbor Commissioners has instructed the harbor engineer, Frank G. White, to prepare plans and specifications for the extension of Piers 42 and 44 a distance of 115 feet, making a new pier length of 915 feet each. A connecting wharf will be built at the shore end extending 160 feet into the slip. This bulkhead wharf will give more cargo space on the piers and will provide additional office and waiting room space for the additional business which it is expected that the new liners will develop.

Bids Opened for Pipe Line Dredge—Bids were called for May 28 by the U.S. Engineers Office, 39 Whitehall Street, New York, for the construction of a 20-inch pipe line dredge to be 182 ft. 3 in. length over-all.

Contract for Submarine Awarded.—New York Shipbuilding Co., Newark, N. J., has been awarded the contract for the construction of Cuttlefish, fleet submarine No. 171, on a low bid of $3,150,000 and 30 months time. The Electric Boat Co., Groton, Conn., submitted three bids, ranging from $3,297,000 to $3,395,-000.

The winning bid was under Class 2, providing that the submarine be built by the design prepared by the Navy Department and the machinery to be provided by the Department. This is the last of the nine submarines authorized under the Act of August 29, 1916.

Destroyer Bids in July.—According to reports from Washington, the U. S. Navy Department will have plans and specifications for the 11 treaty destroyers ready to submit to respective bidders in July. The last session of Congress appropriated $10,000,000 for starting this construction program.

New Ferryboat on Puget Sound.—The Ballard Marine Railway Company of Seattle last month delivered to the Puget Sound Navigation Company, Seattle, the new automobile and passenger ferry Rosario, which is intended for regular service between Bellingham, Anacortes, San Juan Island, and Sidney. The craft is 150 ft. long, 40 ft. beam, and is powered by a 600-horsepower Sumner diesel engine. The ferry is very nicely fitted out, the cabins are paneled with mahogany, she has a large dining room and comfortable observation room with upholstered chairs. The galley is equipped with an electric refrigerator and an oil-burning range. Her electrical auxiliaries are supplied with power by a Fairbanks-Morse diesel unit of 30-horsepower, supplied and installed by the Buxham Marine Electric Company of Seattle. She has capacity for forty automobiles.

New Auxiliaries on Transports.—One of the most important marine engineering reconditioning jobs on the Pacific Coast in 1931 is the installation of new auxiliary power plant in the U. S. Army Transports Cambrai and Somme. Complete new Westinghouse equipment was purchased by the United States Army for each of these vessels. This equipment in each ship consists of:

Two 150-k.w. turbo-generating sets.
One switchboard
One auxiliary condenser (1500 sq. ft. cooling surface)
One vertical propeller type circulating pump and motor
Two condensate pumps and motors
One bank of ejectors

On the Cambrai the contract for installation of this machinery was carried out by the United Engineering Company.

The General Engineering & Dry Dock Company was low bidder on the Somme and is now busy on that vessel.

In each case the electric wiring is being installed by the Lalor Electric & Engineering Co.

Whittier Repairs. — Bethlehem Shipbuilding Corp., Ltd., Union Plant, San Francisco, was awarded contract for damage repairs to the Arrow Line freighter Helen Whittier, which struck a rock off Cape San Martin on May 14. The vessel made San Francisco under own power and a survey on the Hunter's Point Drydock showed that in some places the keel plates are punctured and bent upward. The repairs will cost about $60,000.

Ferryboat Built at Vancouver.—The Burrard Drydock Company, Vancouver, B. C., recently completed the ferryboat Agassiz for operation on the Fraser River above New Westminster. The boat is 120 ft. long, with capacity for 20 automobiles and cost about $90,000.

Barges Ordered. — The Midland Barge Co., Midland, Pa., has an order from the U. S. Engineering, Mobile, Ala., for three barges 100 by 24 by 7 ft.

This yard also has an order from the West Virginia Sand & Gravel Co., Charleston, West Va., for four standard sand and gravel barges to be 100 by 26 by 6 ft. 6 in. dimensions and to cost $8000 each.

Canadian Patrol Boats—The Walkems Shipyards, Ltd., Vancouver, B. C., have recently completed for the Dominion Fisheries Department four patrol boats for operation on the British Columbia coast. These are 52 ft. long, 12 ft. molded breadth, 6 ft. $2\frac{1}{2}$ in. molded depth; $4\frac{3}{4}$ ft. draft. Each boat is powered by a 72 brake horsepower Gardner full diesel engine operating at 400 revolutions per minute and developing a speed of 10 miles an hour.

Submit Bids for Derrick. — The English Construction Company, Washington, D. C., was reported to be low bidder for the construction of two floating steel derricks for the Bureau of Yards and Docks, Navy Department, Washington, D. C. One derrick is for the Mare Island Navy Yard and one for the Naval Destroyer Base at San Diego. They are to be of 25 tons capacity, operated by steam, with oil-burning boilers.

Another Electric Tanker for Atlantic Refining.—The ninth electric tanker and the thirteenth diesel-electric vessel to be built for the Atlantic Refining Company is now under construction by the Sun Shipbuilding Company of Chester, Pa. This vessel, to be completed late this summer, has the distinction also of being all electrically welded in its hull construction.

Nine tankers and four tugs make up the total of 13 diesel-electric vessels owned by this company. Of this number, the electric equipment was supplied for eight (including the new one) by the General Electric Company, and for three more by the British Thomson-Houston Company, an affiliated company in Great Britain.

The power plant of the new tanker will consist of three Cooper-Bessemer diesel engines each driving a 105-kilowatt, direct-current generator, two with direct-connecting auxiliary generators of 25 kilowatts capacity each. The main generators will deliver current at 125 volts and the auxiliary generators at 120 volts. The propulsion motor will be rated 375 horsepower, 375 volts, 150 revolutions per minute, and will be a shunt-wound, direct current machine.

New Equipment at Yard.—The Todd Shipyards Corporation has recently added to the equipment of its Clinton Plant in Brooklyn facilities for supplying vessels with 200-250 volt direct current. This service is available 24 hours a day and is of sufficient capacity to take care of all "in port" operations.

Ship owners and operators will find it a great convenience to be able to shut down their vessel's auxiliary generating plants during overhaul or repair periods.

Berthing Tug Wanted for Vancouver. — The Vancouver Chamber of Shipping held a meeting April 29 for the purpose of considering the recommendation of shipping interests that a berthing tug be placed in service in the harbor to take care of deep sea ships in berthing, relieving pilots of that responsibility. It is claimed that the cost of the tug would be more than offset by the annual saving of expense due to damage to jetties and piers by the larger ships seeking their docks.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of May 1, 1931

Pacific Coast

ALBINA ENGINE & MACHINE WORKS,
Portland, Oregon

Purchasing Agent. Jno W. West

I P. Hosford, hull 34, tunnel stern, passenger and freight motorship for Harkins Transportation Co., Portland, Ore.; 160 L.B.P., 30 beam; 15 mi. speed; Atlas-Imperial diesel eng.; keel 2/10/31; launch 5/7/31 est.; deliver 6/1/31 est.

BETHLEHEM SHIPBUILDING CORP., Ltd.
Union Plant, San Francisco

Hull 5350, pineapple barge for Inter-Island Steam Navigation Co., Honolulu; 175 x 44 x 11 ft.; keel 3/2/31; launched 4/13/31; deliver 5/1/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193′ L.O.A.; 190′ L.W.L.; 30′ beam; 11′9″ mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30, launched 4/2/31; deliver 7/15/31 est.

Samona II, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam, 10.5 draft; two 500 H.P. Winton diesel engs.; keel 3/15/31; delivery Aug./31 est.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

Not named, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60′10″ over-all; 15 beam; 7′2″ depth; 120 H.P. Fairbanks-Morse diesel eng.; keel 3/15/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112′2″ L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; launch 7/1/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204′11″ L.O.A.; 43′6″ breadth at deck; Atlas-Imperial diesel; keel 5/25/31 est.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

Essington, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink; keel 12/8/30; launched 4/2/31; deliver 5/14/31 est.

Northern Cross, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8′6″ molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; keel 2/15/31; launch and deliver 5/18/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement.

Repairs, Pacific Coast

ALBINA ENGINE & MACHINE WORKS,
Portland, Ore.

Cleaning and painting: Redwing. Engine repairs: Lockgoil. New crank shaft: Robert Young. General repairs: m.s. Pacific Shipper, Pacific Exporter, Stensby, s.s. Ipswich.

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Dock, clean, paint, misc. repairs: s.s. Emma Alexander, Shell Barge No. 4, s.s. Ruth Alexander, m.s. Silvercedar, s.s. Spencer Kellogg, s.s. Tejon, s.s. Korrigan III, s.s. Golden Harvest, m.s. Chile, m.s. California Standard, s.s. Admiral Chase, barge Maltha, barge Martinez. Pipe repairs: m.s. Narragansett, s.s. Dorothy Luckenbach, s.s. Emidio, s.s. Point Sur. Caulk rivets and seams and place anchor aboard: s.s. Lebec. Furnish and install 2 lag screws; tug Sea Prince. Remove lagging from cylinders: s.s. Jane Nettleton. Repairs to deck steam line: s.s Marit. Repair generator: s.s. Sarita. Drydock, propeller repairs: m.s. Edward Luckenbach. Fish bolts in main cargo tanks: s.s. Roanoke. Drydock, misc. repairs: m.s. Vermar. Manganese bronze propeller blades: s.s. W. S. Miller. Misc. repairs: Argyll, Dilworth, m.s. Lio, m.s. Trocas, Pennsylvania, Point Montara, Saramacca, Montezuma, Washington, Esparta, Maunalei, Dorothy Luckenbach, California, President Pierce, President Johnson, Suriname, U.S.A.T. Cambrai, pilot boat Gracie S., Union Oil barge 1922, 1923, Santa Fe Barge No. 6.

COLLINGWOOD SHIPYARDS, Ltd., Collingwood, Ont.

Rudder repairs to S.S. Farrandoc.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Drydock and new propeller: s.s. Richileu. Drydock and annual inspection: s.s. Eldorado. New steel deck in after quarters: s.s. William Isom. New crank case, trunk, and cylinder port engine: m.s. Camina.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydock for survey, caulk and blank off shaft log: s.s. Tamalpais. Drydock, clean, paint: U.S.A.T. U.S. Grant (also drew both tail shafts for examination, unship and repair rudder, overhaul sea valves, caulk and weld misc. rivets and seam in hull, misc. repairs), s.s. Glymont (also misc. engine and deck dept. repairs), s.s. Wilmington (also overhaul sea valves), s.s. Silverado (also caulk misc. rivets and seam, overhaul sea valves, repack stern gland), s.s. Margaret Dollar (also drew tail shaft for examination, overhaul sea valves, caulk misc. rivets and seam, range anchor chains, repair damaged shell plates on starboard), s.s. Lake Frances (also caulk and renewed misc. rivets), barge Fruto (also renew hull planking and caulk), yacht Astrid, Alaska packer Bering (also overhaul sea valves, repack stern gland), s.s. Montanan, s.s. West Notus (also caulk misc. rivets and seam), s.s. Satanta (also drew tail shaft, rewood stern bearing), s.s. Delta King (also misc. repairs), ferry Golden Gate, s.s. Sacramento (also overhaul sea valves, caulk misc. rivets and seams, misc. repairs), s.s. Delta Queen (also misc. repairs), s.s. Georgian (also overhauled sea valves), Santa Fe barge No. 5, s.s. Admiral Fiske (also drew tail shaft, rewood lower half of stern bearing, overhaul sea valves, fair propeller blades, misc. repairs), ferry Feather River (ex Ed. Jeffrey) (also misc. repairs), s.s. Mt. Baker, barge Santa Paula (also caulk and cement), Santa Fe Barge No. 1, m.s. Patterson (also renewed sheathing), s.s. Washington (also misc. repairs), schr. Beulah, fishing boat Golden Gate, American Dredging Co. Barges No. 5 and No. 6 (also furnish and install by welding new knuckle strake plates entire length of barge). Drydock for survey, clean, paint, misc. voyage repairs: s.s. Fort Armstrong. Drydock, clean, removed copper sheathing, caulked hull as directed: ferry Thoroughfare.

PRINCE RUPERT DRYDOCK & SHIPYARD,
Prince Rupert, B.C.

Docked, cleaned, painted: launch Lillian D. Docked, cleaned, painted, misc. hull and engine repairs to 6 fish boats. Misc. hull and engine repairs not requiring docking: 61 fish boats. Docked, cleaned, painted, misc. carpenter repairs: 3 scows.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle, Wn.

General repairs: s.s. Admiral Evans, s.s. General W. C. Gorgas. Drydocking and general repairs: s.s. Catherine D, ferry City of Angeles, U.S.A.T. C.S. Dellwood. General overhauling: U.S. lighthouse tender Cedar, s.s. Starr. Repairs to auxiliary motor: m.s. Benj. Franklin. Misc. and voyage repairs: schr. C. S. Holmes, m.s. Mount Vernon, ferry Olympic, ss. President Madison.

U. S. NAVY YARD, Bremerton, Wn.

Misc. repairs and docking: Nevada, Oklahoma, Lea, Waters. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x 26x11 ft.; 5 delivered July/30.

Ten barges for Inland Waterways Corp., Washington, D C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **7 keels laid; 1 launched.**

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; **keel 1/1/31; launched 3/31/31.**

BATH IRON WORKS
Bath, Maine

Malaina, hull 128, steel yacht; B. T. Dobson, designer; owner not named; 168 L.B P.; 26 beam; 9 draft; twin Winton diesel engs.: 1600 I.H.P.

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; **launched 4/10/31.**

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30; **launched 4/18/31; trials 4/25/31.**

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H P. diesel eng.; keel 9/1/30; launch 6/20/31 est.: deliver 8/10/31 est.

Illinois, hull 142, trawler for Red Diamond Trawling Co.; 132' L.O.A.; 24 beam; 14 depth; 500 B.H.P. Fairbanks-Morse diesel eng.; keel 10/15/30; **launched 3/19/31; delivered 3/25/31.**

Maine, hull 143, sister to above; keel 10/18/30; **delivered 4/25/31.**

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30; **launched 4/30/31;** deliver 6/2/31 est.

Halonia, hull 146, diesel-elec. yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.; keel 1/13/31.

Felicia, hull 145, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; **keel 3/30/31;** deliver 8/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; **keel 4/25/31;** deliver 11/29/31 est.

Hull 148, same as above; keel 5/25/31 est.; deliver 12/24/31 est.

Hull 149, same as above; keel 5/25/31 est.; deliver 1/18/32 est.

Hull 150, same as above; keel 5/28/31 est.: deliver 2/12/32 est.

Hull 151, same as above; keel 5/28/31 est.; deliver 3/9/32 est.

Hull 152, same as above; keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Monterey, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons.

Mariposa, hull 1441, sister to above.

Lurline, hull 1447, sister to above

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I H P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4284, steel barges for Western Maryland Railway Co.; **launched 3 25 31.**

Hull 4285, same as above.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel ferryboat for the Seaboard Air Line; 65 x 22 ft., 120 H P. Fairbanks-Morse eng.; keel 3/7/31; launch 5/20/31 est.

One all-welded steel yacht, owner not named; 50 x 13 ft.; diesel eng.; keel 11/30.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2994, 81-foot commuter boat, owner not named; 2 300-H.P. Speedway engines.

Hull 2996, 110-ft. cruiser for A. M. Dick; 3 300-H.P. Speedway diesels.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Danora, hull 145, steel yacht, owner not named: 108 L.B.P.; 19'6" beam; 6 loaded draft; 15 mi. speed; 130 D.W.T.; 400 I.H.P. diesel eng.; keel 10/1/30; **launched 4/15/31; delivered 5/1/31.**

Rosewill II, hull 146, steel yacht, owner not named; 126 L.B.P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30; launch 5/16/31 est.; deliver 5/20/31 est.

Ber-clo III, hull 147, steel yacht for A. S. Close, Toledo; 106 L.B.P.; 17'6" beam; 6 loaded draft; 14 M.P.H.; 98 D.W.T.; 300 I. H. P. diesel eng.; keel 11/25/30; **launched 5/2/31;** deliver 5/15/31 est.

Not named, hull 148, wood yacht, for S. L. Avery, Chicago; 91'6" L.B.P.; 15'9" beam; 4'6" loaded draft; 85 D.W.T.; 24 mi. per hour speed; 1000 I.H.P. diesel eng.; keel 4/1/31; launch 6/15/31 est.; deliver 7/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hull 1084, 50-ton whirler derrick boat for Erie Railroad Co.

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **4 delivered.**

Hulls 1116-1117, two barges for U. S. Eng. Office, Pittsburgh, Pa.; 100 x 26 x 7'3".

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x 11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Oil Transfer No. 22, hull 119, steel harbor barge for Oil Transfer Corp.; 175x36 x12'7-1/8"; keel 5/19/30; **launched 4/3/31.**

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers.

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 watertube boilers; keel 3/15/31; launch 5/9/31 est.; deliver 6/15/31 est.

Hull 277, sister to above, keel 3/25/31; launch 5/16/31 est.; deliver 7/1/31 est.

Not named, hull 278, tug for Dunbar & Sullivan Dredging Co.; 90 L.B.P.; 24'6" beam; 13 loaded draft; 12 loaded speed; comp. steam eng. 750 I.H.P.; 1 14-ft. Scotch boiler; keel 6/1/31 est.; launch 7/15/31 est.; deliver 8/15/31 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; keel 2/9/31; launched 3/21/31; deliver 4/15/31 est.

Huckleberry Finn, hull 1691, river towboat for Inland Waterways Corp., Washington, D C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; **keel 4/28/31.**

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer.

Harry B. Williams, hull 268, steel tug for Great Lakes Dredge & Dock Co.; 115 x 26 x 15 ft.; one Babcock & Wilcox boiler; 850 H P. turbine with reduction gear; keel 1/12/31; launched 3/21/31; deliver 5/31 est.

Hull 269, dump scow for Ed. E. Gillen Co., Milwaukee: 124 L.O.A.; 30 beam; 11'6" depth; keel 1/21/31; **launched 4/11/31; delivered 4/14/31.**

Hull 270, deck scow for U. S. Engineers, Chicago; 56 x 20 x 4'8"; keel 2/12/31; launched 3/21/31.

Hull 271, deck scow for Great Lakes Dredge & Dock Co.; 130 x 40 x 9 ft.; keel 2/25/31; **launched 4/15/31; delivered 4/17/31.**

Hull 272, same as above; keel 2/27/31; **launched and delivered 4/17/31.**

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x 26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S.

Engineering Office, New Orleans: 65'6' x 17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

Steel freighter for Victor Lynn Transportation Co., 210 gro. tons; keel 12/30; launch 4/18/31 est.

Five barges for Inland Waterways, Corp. Washington, D.C., 230 x 45 x 11 ft.; 2 **keels laid.**

Three barges for U.S.A. Engineers, Mobile, Ala.; 100 x 24 x 7 ft.

Four barges for W. Virginia Sand & Gravel Co., 100 x 26 x 6'7".

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; launch and deliver 7/1/31 est.

Hull 249, same as above: **keel 1/17/31.**

Hull 250, dredge for Sternberg Dredging Co.: 150x50x7'10" depth; **keel 3/12/31;** launch 5/15/31 est.

Not named, hull 253, steamboat hull for Woods Lumber Co.: 110 L.B.P.; 26 beam; 4'8" depth; keel 5/25/31 est.; launch 6/20/31 est.

Hull 254, derrick hull for Woods Lumber Co.; 82 x 28 x 4 ft.; **keel 5/5/31;** launch 6/20/31 est.

Hull 255, barge for Sternberg Dredging Co.: 100 x 26 x 6'6"; keel 6/22/31 est.; launch 7/25/31 est.

Hull 256, oil barge for stock: 140 L.B.P.; 26 beam; 8 depth; keel 6/15/31 est; launch 7/10/31 est.

Hull 257, same as above; keel 6/15/31 est.; launch 7/20/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 7/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.; 386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; launched 3/7/31; deliver 5/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 8/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launch 8/31 est.; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 12/31 est.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/31 est., deliver 5/32 est.

Not named, hull 351, sister to above; keel 9/31 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Exeter, [illegible] passenger and cargo steamers for Export Steamship Corp., New York: 450x61x 42'3"; keel 8/11/30; **launched 4/4/31.**

Excambion, hull 397, sister to above; keel 10/25/30; launch 5/16/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Not named, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers; keel 10/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; launched 3/14/31; complete 5/20/31 est.

Richmond, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; keel 2/12/31; **launched 5/5/31;** deliver 6/17/31.

Not named, hull 1053, steel hull and steel superstructure for auto carrying ferryboat for Wilson Line, Inc., Wilmington, Del.; 174'7" L.B.P.; 58 beam; 9'3" loaded draft; diesel machinery and other work by owners.

Repairs: City of Washington, hull 1052, rebuilding from main deck up. To have three decks above main deck and restored to original condition. (Damaged by fire). Wilson Line, Inc.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 270, diesel tug for Atlantic, Gulf & Pacific Co., New York; 35 L.B.P.; 11'7" beam; 4'1" loaded draft; 75 B.H.P. Fairbanks-Morse diesel eng.; keel 4/1/31; **launched 5/6/31;** deliver 5/15/31 est.

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft, 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; launch 7/13/31 est.; deliver 8/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 137, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 11/13/30; launch 5/16/31 est.; deliver 6/1/31 est.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 6/1/31 est., deliver 6/15/31 est.

Hull 139, steel oil-tank towing barge for Standard Transp. Co.; 225 x 38 x 10 ft.; **keel 3/30/31.**

Hull 140, sister to above, **keel 4/2/31.**

Hulls 141-145 incl., five small barges for Sun Oil Co.; 70 x 19 ft.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Not named, hull 50, steam ferry for Department of Plant & Structure, City of New York, 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan. 31.

Not named, hull 51, sister to above; keel Jan./31.

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel Jan./31.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Not named, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launch 6/1/31 est.; deliver 10/1/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

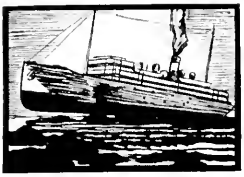
THE CHARLES WARD ENGINEERING WORKS
Charleston, W. Va.

Purchasing Agent: E. T. Jones.

Henry A. Laughlin, hull 88, twin-screw, tunnel type, steam propelled towboat for the Vesta Coal Company, Pittsburgh, Pa.; 160 x 29'6" x 8'9"; keel 9/13/30; **launched 3/25/31; delivered 4/27/31.**

Vesta, hull 89, sister to above; keel 10/9/30; launched 3/27/31; deliver 5/15/31 est.

Accept Bid for One Ship.—The Shipping Board authorized sale, April 22, of the steamship Lake Girth to the Schuylkill Transportation Company of Philadelphia for $10,000 cash, with the understanding that the vessel be converted to a barge. Bids for the purchase of nine other vessels for scrapping were rejected. These were the offers of the Boston Iron and Metal Company and Union Shipbuilding Company, both of Baltimore. The offers rejected averaged about 85 cents a ton, a price considered inadequate in view of recent sales of this character. The Lake Girth is a steel cargo steamer of 4155 deadweight tons.



Marine Insurance

Edited by James A. Quinby

Claims Under Cargo Policies

Elementary Steps in Recovering Insurable Losses

THE average cargo owner is prone to consider that the payment of a premium is the only prerequisite to the payment of a loss. This state of mind results in numerous delays and misunderstandings in connection with losses. As a matter of cold and actual fact, the underwriter is entitled to certain specific documents and information before he becomes liable for the payment of cargo damage. Every cargo policy provides that the assured shall give prompt notice of his claim and usually specifies that the claim will be paid within a certain specified period, after due proof is made.

Law of Averages

"I can't renew the Sinking Sue,"
The underwriter said.
"She sprung ten leaks in seven weeks—
Her record's in the red."

"Have you, pray tell, aught else to sell?"
The underwriter sighed.
"A perfect risk, a beauteous risk,"
The hardy broker cried.

"You may renew the Mary Q
At half her former rate.
For all her years, no loss appears
Upon her card to date."

The risk and rate man rose to state,
"That is no proof at all.
Her Waterloo is overdue,
She's riding for a fall."

—J. A. Q.

For the assistance of cargo owners whose experience and knowledge of marine insurance may be somewhat limited, we set forth below the various steps which should be taken to make certain the proper collection of the cargo loss from an underwriter:

I. The Preliminary Notice

As soon as a cargo owner has knowledge of damage to his goods, he should promptly notify his underwriter. This should be done by telephone and confirmed by letter. The telephone communication is necessary to give the underwriter immediate knowledge of the situation, and the confirmation by letter is advisable in order that no dispute may later arise as to the fact of such notification. Many cargo owners allow themselves to grow somewhat lax in giving preliminary advices, because their underwriters have protected them from time immemorial even where such advices are not given. It is quite true that underwriters do not customarily rely upon technical defenses, but there is always the possibility of a situation where a cancelled policy is in the offing, or where some other circumstance will incline the insurer to be unusually technical.

2. Claim on Carrier

In every case of cargo damage, no matter what the cause, the consignee should immediately file claim upon the carrier, giving particulars of the shipment, the name of the vessel, the date of its arrival, and stating

> "We hereby file claim upon you for the damage, the amount of which has not yet been determined."

This should be followed by a formal claim upon the carrier, stating the exact amount of the damage as soon as the latter is determined. It is well to address to the underwriter a copy of this preliminary claim upon the carrier, in order that the underwriter may know that its subrogated rights against the carrier are being protected.

Cargo owners are often tempted to overlook filing claim upon the carrier, due to a prevalent belief that the underwriter will protect them in any event. The filing of a claim is important for two reasons:

First, The underwriters' subrogated rights should be protected in order that the insurance account may benefit by any possible recovery, as in the long run the ratio of recovery to loss has a definite and direct effect upon the rate of premium;

Secondly, The damage may turn out to be due to a cause for which the insurer is not liable, and the cargo owner is then protecting his own interest by filing a claim against the carrier in time to comply with the requirements of the bill of lading.

3. Survey

A competent cargo surveyor should be immediately retained to make an examination of the goods, followed by a report of the nature, extent, and cause of damage. This examination should be made, if possible, before the goods are removed from the pier, in order that intervening causes of damage may not be asserted and relied upon to defeat the claim against the carrier or the insurance company. Ordinarily, the insurer will select and employ the surveyor. This should be arranged at the time of the preliminary telephone notification to the underwriter. If the claim is not one for which the policy is liable, the surveyor fee is technically chargeable to the owner of the goods, although underwriters customarily stand the charge even in these circumstances in order to encourage the employment of surveyors.

4. Claim Documents

Having taken the precautions mentioned above, the assured should then present his final claim upon his underwriter, supported by originals or certified copies of:

1. Bill of Lading

2. Invoices
3. Prepaid freight bills (if freight is included in the coverage)
4. Survey report
5. Correspondence with the carrier, including claim and answer.

A general compliance with these recommendations will shorten the time in collecting claims and avoid the necessity for numerous instructions and requests for additional documents. Once the claim is presented and supported as above, the only detail which the assured need consider is the fact that most cargo policies provide that suit to enforce the claim must be brought within one year after the damage occurs.

English Court Denies Demurrage in General Average

IN Wetherall & Co. versus The London Assurance XXXVI Commercial Cases 181, a steamer belonging to the plaintiffs was insured under a hull policy issued by the defendants. During the currency of the policy, the vessel ran ashore and suffered certain particular and general average damage which, together with particular average damage sustained on a prior voyage was repaired in dry-dock. The vessel was under repair from June 11 to June 20, 1929, and was not otherwise occupied during repairs. The particular average and general average repairs were carried out simultaneously. Had they been undertaken separately, each would have occupied the entire nine-day period. The owners were out of pocket the value of the ship's use during the nine days in question, since she was under a charter which allowed deduction for time spent in repairs.

As no recovery could be had under the hull policy which would include this time as part of the particular average loss, the adjusters estimated the demurrage value of the time and allowed half of it in general average. The underwriters refused to pay, and litigation ensued.

The Commercial Court (Rowlatt, J.) held that the loss of time, as distinct from actual expense, could not be recovered in general average, and quoted the following passage from the Leitrim (8 Com. Cas. 6, p. 256) as controlling:

"But it does not at all follow that the mere loss of the profitable employment of the vessel as distinguished from actual expenses should in such a case be allowed. In the first place, so far as I can ascertain, a loss of this character has never been claimed in general average. It is not introduced in the York-Antwerp Rules, nor can I find any trace of it being allowed by the laws of any foreign country, though many of them contain provisions as to the allowance in general average of the wages and maintenance of the crew. It may be said, why on principle should not the loss of time be compensated for where that loss is due to the necessity for repairing damage, itself the subject of general average? I think the answer is that although possibly there may be cases in which the loss of time is not common to all concerned, at any rate in cases like the present the loss of time is common to all the parties interested and all suffer damage by the delay, so that the damages by loss of time may be considered proportionate to the interests, and may be left out of consideration."

Only a Scrap of Paper

THE United States District Court for the Southern District of New York has recently used language calculated to put a severe dent in the self-esteem of the noble tribe of general average adjusters. (The Nesco, 47 Fed. 2nd. 643; 1931 A.M.C. 657). The case itself is still pending and involves the refusal of cargo underwriters to pay amounts shown due from them as contributions in a general average statement. The present citation arises from rulings upon libelants' exceptions to the respondents' answer. In order to determine the fixing of the burden of proof, it became necessary for the court to determine the nature and status of the average adjustment, which the shipowner naturally contended was a legal document establishing a prima facie case in support of the contributions alleged to be due. As Judge Woolsey remarks in his opinion:

"If such a statement is considered prima facie proof against cargo owners of the amounts therein claimed due from them, the position of a cargo owner sued in general average would be quite different from his position if the libellant in such a case is still at large on the facts. For in the first alternative the cargo owner would have to justify affirmatively his refusal to pay his contribution but, in the second, could put the libellant to his proof."

The court then goes on to distinguish those cases involving fraud or estoppel, and concludes that the average statement "is not prima facie or presumptive evidence against a person claimed thereby to be liable for contribution, but that the facts are all open to inquiry." The opinion then cites at length the decision of the Judicial Committee of the Privy Council in the case of Wavertree Sailing Ship Co. vs. Love, 1897 App. Cas. 3733, in which the following historical comment appears:

"The profession or calling of an average stater, or average adjuster as it is sometimes called, is of comparatively modern origin. The right to receive and the obligation to make general average contribution existed long before any class of persons devoted themselves as their calling to the preparation of average statements. It was formerly, according to Lord Tenterden, the practice to employ an insurance broker for the purpose. The shipowner was not bound to employ a member of any particular class of persons or indeed to employ any one at all. He might, if he pleased, make out his own average statement; and he may do the same at the present time if so minded. If he engages the services of an average stater, it is merely as a matter of business convenience on his part. The average stater is not engaged by nor does he act on behalf of any of the other parties concerned. nor does his statement bind them. It is put forward by the shipowner as representing his view of the general average rights and obligations, but the statement or adjustment is open to question in every particular by any of the parties who may be called on to contribute."

"This authority," says Judge Woolsey, "is the most persuasive I have found, and wholly satisfies me."

"A statement of general average is, legally speaking, therefore, entirely ex parte, although it may be based in part on information furnished to the shipowner by cargo owners as to the nature and value of their goods. It may not be offered as prima facie proof, as may be the statement of an auditor appointed by the Court in an action at law to examine a long account or complicated facts, and, of course, it has not the effect of an arbitration, which is a voluntary agreed submission by both parties to a named person or persons. (Cf. Alpin, 23 Fed. 815, 819.)

"The fact that the shipowner may have employed a general average adjuster as his agent to make up the average statement is merely a question of the shipowner's convenience and does not add to the probative value of the statement. A statement of general average, therefore, although it has a somewhat elaborate background and necessarily is based on a multipartite and complicated calculation, does not rise to any greater legal dignity than does any other statement of account by a shipowner for money claimed to be due from a cargo owner."

Insurance Class Meetings

THE Association of Marine Underwriters of San Francisco, at their Study Class meeting of April 20, were addressed by the Honorable E. Jack Spaulding, member of the San Francisco Board of Supervisors, and by A. Middleton Beckett, manager of the Adjusting Department of Johnson & Higgins.

Mr. Spaulding discussed the future of airport and air transit facilities in the San Francisco Bay district, with particular reference to the situation now confronting the city in connection with the development of Mills Field. He was strongly of the opinion that the city should pass the proposed bond issue and proceed to make Mills Field one of the largest and best equipped airports in the country.

Mr. Beckett had for his subject "Forwarding charges and substituted expense in general average." He handled this difficult subject in a very thorough manner, first pointing out that substituted expenses were those items incurred by the shipowner in order to save larger general average charges. The American courts have held that such expenses were not true general average charges and their allowance is therefore dependent upon agreement, which agreement may be specifically entered into in each separate case or may be embodied in the bill of lading by inclusion of rule 10-d of the York-Antwerp rules of 1890, or by rule 10-d and rule F of the York Antwerp Rules of 1924.

Mr. Beckett asserted that the shipowner was entitled to recover substituted expenses as allowances, since the purpose of such expenses was the same as the purpose of general average expenditures or sacrifices; i.e., to substitute a lesser loss for a greater one.

The Study Class of the Association of Marine Underwriters of San Francisco, at their meeting of May 4, were addressed by Captain David E. Theleen of the U. S. Navy, and Paul A. Pier of Cosgrove & Company.

Captain Theleen, who is in charge of the U. S. Hydrographic Office in San Francisco, had for his subject "Practical Navigation." After discussing the compass, charts, log, radio compass, and other aids to navigation which science and invention have placed at the disposal of the modern navigator, the speaker explained and illustrated certain mathematical calculations by which the mariner was able to locate his position on a chart or determine his position in reference to known points on shore.

Mr. Pier, who is well known as a member of the staff of Cosgrove & Company, and is also the Pacific Coast representative of Frank B. Hall & Company of New

York, spoke on "Particular average under hull policies". He touched upon the distinction between total and partial losses under hull policies, and outlined the method of adjusting hull losses, with particular reference to the type and amount of damage necessary to open the franchise under the usual modern hull policy.

Freights, Charters, Sales

May 14, 1931

THE following steamers have been fixed with grain to U.K./Continent: A steamer, Vancouver/San Francisco Range (6 berths) to Antwerp Rotterdam Middlesborough and Leith 22/6, 6d less if 3 ports of discharge, April/May; A steamer, Vancouver, B.C. to Antwerp and Rotterdam, 20/9, Canadian Cooperative Wheat Producers Ass'n; A steamer, Vancouver, B. C., to Antwerp and Rotterdam, 21/-, Canadian Cooperative Wheat Producers Ass'n; A steamer, (same); A steamer (same); British str. Indian City, Vancouver, B. C., to Antwerp and Rotterdam, 21/-, May, L. Dreyfus and Co.; British str. Yearby, Vancouver, B.C., to Antwerp and Rotterdam, 21/-, London and Hamburg 21/6, Hull, Havre, or Dunkirk 21/9, May, Canadian Cooperative Wheat Producers Ass'n; British str. Rudby, (same); British str. York City, Vancouver, B.C., to Antwerp or Rotterdam, 21/6, option London, Hull, Continent, Bordeaux, Hamburg Range, 22/-, May/June, Mitchell Grain Co. Ltd.; British str. Clearton, Vancouver, B. C., to London, May, Dale & Co., Ltd.; British str. Holystone, Vancouver, B.C., to U.K./Cont., May, Dale & Co., Ltd.; British str. Kurdistan, (same); British str. Trevethal, Vancouver, B.C., to Marseilles and Genoa, May, Strauss & Co.; British str. Langleetarn, Vancouver, B.C., to U.K./Cont., 22/-, option Antwerp and Rotterdam, 21/6, June, Canadian Cooperative Wheat Producers Ass'n; British str. Somersby, Vancouver, B.C., to U.K./Cont., 21/6, May/June, Canadian Cooperative Wheat Producers Ass'n; British str. Hindpool Vancouver, B.C., to Antwerp, Rotterdam, 20/9, both ports discharge, 21/3, May; British str. . . . .pool, Vancouver, B.C., to Antwerp, Rotterdam, 21/-, both ports discharge, 21/6, May; British str. Riverton, Vancouver, B.C., to Hamburg, May, Dale & Co.; British m.s. Innesmoor, Columbia River to U.K./Cont., June, Dale & Co.; British str. Amberton, Vancouver, B.C., to U.K./Cont., June, Dale & Co.; British str. Grainton, (same); British str. Paris City, Vancouver to U.K./Cont., 22/6, June, Mitchell Grain Co.; A Ropner steamer, Vancouver, B.C., to Antwerp/Rotterdam, 21/6, option London/Hull/Hamburg/Dunkirk, 22/-, May/June; A Smith steamer, Vancouver, B.C., to Antwerp/Rotterdam, 21/6, both ports, 22/-, option London Hull/Bordeaux/Hamburg, 22/6, May/June; Norwegian m.s. Ferneliff, British Columbia to Newport and Avonmouth, May, Canadian American Shipping Co.; British str. Heronpool, Prince Rupert, B.C., to U.K./Cont., May, Empire Shipping Co. Ltd.; British str. Invella British Columbia and Puget Sound to London, May, Canadian American Shipping Co.

The following steamers have been fixed with lumber to the Orient: British str. Antiope, Puget Sound to Japan, April, Canadia American Shipping Co.; Norwegian m.s. Fernglen, British Columbia to Japan, April, Canadian American Shipping Co.; British str. Cape Verde, Puget Sound to Shanghai, May, Canadian American Shipping Co.

The American str. S. A. Perkins, has been fixed with lumber from Puget Sound and Columbia River to Guaymas, prompt, by Chas. R. McCormick Co.

The French schr. Normandie has been fixed with lumber from British Columbia to Fiji Islands, 12.

The following time charters have been reported: British m.s. Comliebank, delivery North Pacific redelivery Orient, 1.65, May, Strange & Co.; British m.s. Westmore, delivery San Francisco/Vancouver/Range, redelivery China/Japan, 1.60, April; Danish m.s. Nordpol, delivery Charleston May 5, redelivery U.K. / Continent Bordeaux / Hamburg range via North Pacific, 1.05, Canadian Transport Co.

The following sales have been reported: American schr. Minnie A. Caine, Chas. Nelson Co. to Malibri Maritime Corp. Ltd., Santa Monica; French schr. Normandie, L. Ozanne to F. D. Harris; American str. Brookdale, Geo. Walker Co. to McCormick Steamship Co.; American str. John C. Kirkpatrick, R. S. Kinbeck Trustee to John H. Mulkey, $2110. American str. Trinidad, Hammond Lumber Co. to Sudden & Christenson; American str. Tiverton, J. O. Davenport to Hammond Lumber Company; American str. Pheonix, Goodyear Redwood Lumber Co. to Geo. H. Pitt, $100, sold at public auction.

PAGE BROS., Brokers.

Trade Notes

Diesels for Hoover Dam. Announcement has just been made by the Six Companies, Inc., builders of Hoover Dam, that the first purchase order for major equipment to be used in the construction was issued to the Atlas-Imperial Diesel Engine Co. of Oakland, California, for portable Atlas diesels for operating air compressors. Under a subcontract, J. L. LeTourneau is already using Atlas diesel powered portable units and excavators on the preliminary road work.

One of the most popular products now being built by the Atlas-Imperial Diesel Engine Co. is the portable power unit similar to the type ordered by the Six Companies, Inc. This unit is supplied in 4 and 6 cylinder sizes, self contained and completely equipped for use on road crushers, concrete mixers, air compressors, and similar equipment.

Linoleum Plant for Pacific Coast.—Announcement has been made by The Paraffine Companies, Inc., of the establishment of a linoleum plant on the Pacific Coast. Work has already progressed on the erection of a large modern manufacturing unit at the 32 acre Pabco plant at Emeryville, California. Herein are to be manufactured plain, jaspe, and battleship linoleums with borders and ornaments. This will be the first linoleum plant west of Pennsylvania. It is said by the Pabco officials that it will be the most modern linoleum plant in the world.

Of particular interest to western architects and building trades is the fact that this plant is advantageously located not only for the supplying of standard linoleums but for the quick accomplishment of the requirements of the so-called "tailor made" jobs. The architectural vogue for plain linoleums with contrasting borders, corner and center designs for installations typifying the type of business using the space has brought about the need for an extraordinarily close contact between the architect, the contractor, the owner, and the manufacturer of the linoleum.

Pabco products have for the past many years had a most favorable acquaintance and standing with architects, contractors, and building owners throughout the West. And the [illegible]ary service that has been [illegible] in connection with these [illegible] will be offered in intensified [illegible]n by the new linoleum [illegible].

The sales and designing department will be in the care of G. Mott, well known to California architects and building owners due to his several years in charge of the contracting division of one of the large western linoleum dealers. Prior to that Mr. Mott was with one of the eastern linoleum manufacturers. The plant operation will be in charge of E. B. Grosh, former general plant superintendent and for fourteen years with one of the country's oldest and largest manufacturers of linoleums.

Heads Pump Division. — Fairbanks, Morse & Co. has announced the appointment of R. R. Bacon, former advertising manager for the company, as manager of the Pump Sales Division with headquarters in Chicago.

Mr. Bacon has been associated with the company since 1925 when he took charge of publicity for the Diesel Engine Division. Shortly thereafter he was placed in charge of general publicity, and since 1929 has been manager of the Advertising and Publicity Department. From 1922 to 1925 he was associate editor of Power Plant Engineering. Prior to that time he was assistant engineering editor of Electrical World and for three years had been assistant electrical engineer for the Copper Range Mining Co. He is a graduate Electrical Engineer, University of Illinois, 1916.

The engineering, sales promotion, and managerial experience acquired through his past connections ably fit him for his new duties in directing the marketing of Fairbanks-Morse pumping equipment.

Westinghouse Elects Officers.—At the organization meeting of the board of directors of the Westinghouse Electric and Manufacturing Company held April 29, the following officials were elected. A. W. Robertson, chairman of the board; F. A. Merrick, president; J. S. Tritle, vice-president in charge of manufacturing; S.M. Kintner, vice-president in charge of engineering; W. S. Rugg, vice-president in charge of sales; L. A. Osborne, H. P. Davis, H. D. Shute, J. S. Bennett, H. T. Herr, Walter Cary, T. P. Gaylord, and Harold Smith were reelected vice-presidents.

C. H. Terry was elected an honorary vice president. E. M. Herr was reelected vice-chairman.

Cory Moves Plant.—Announcement was made May 9 by A. P. Homer, general manager, of the completion of plans for moving the plant of Chas. Cory Corporation, manufacturer of marine instruments, telegraphs, and other intercommunication equipment, from its present building at 68 King Street, New York, to the factory of Pioneer Instrument Company, 754-770 Lexington Ave., Brooklyn, New York.

Chas. Cory Corporation and Pioneer Instrument Company are both divisions of Bendix Aviation Corporation. Pioneer manufactures practically all the aircraft instruments used in this country, all but one airplane at the recent National Aircraft Show having been equipped with Pioneer products. Mr. Homer stated that the transfer of Cory operations to the Pioneer plant would give his company greatly increased facilities, both for manufacture and for development. The Pioneer experimental and research laboratory will be utilized immediately to expedite the present Cory engineering program The management of both organizations will be under the direction of Charles H. Colvin, president of Pioneer Instrument Company. The general sales office of Cory will be located at the new plant, while a district sales office will be maintained in Manhattan.

It is expected, Mr. Homer said, that the move will be made about July 1, the exact date depending upon the completion of additions now under construction at the Brooklyn plant.

The San Francisco offices of the Home of New York, Franklin Fire, and City of New York insurance companies have removed to the Pacific National Bank Building, 333 Montgomery Street, San Francisco. The metropolitan office, for brokerage business only, remains at its old location, 427 California Street.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

THOMAS G. MUNRO is now California representative for The Wm. Powell Co., of Cincinnati, manufacturer of Powell valves. Munro will handle the California territory from the headquarters of the General Machinery & Supply Company, San Francisco, of which firm RUSS PRATT is general manager.

That "Tom" Munro is at home in California is shown by a brief resume of his marine experience. Before joining the Powell organization he was eastern manager for the Crane Packing Company. He entered marine work as a machinist with the Union Iron Works, San Francisco, now Bethlehem, and started to sea on the Ascunsion of the old Pacific Oil Company, now Standard Oil Company (Calif.). This was in 1902; and Charles Grundell of the C. C. Moore & Company, San Francisco, was at that time chief engineer of the vessel. Munro later went out on the historic Pacific Mail steamship China. He served as assistant engineer on the Siberia and Peru under the same flag. He went to Australia on the Sierra of the Oceanic Line. For two and one-half years he was first assistant on the Matson Liner Wilhelmina when she first came

Back in California is "Tom" Munro as representative of the Wm. Powell Co. of Cincinnati.

out to San Francisco in 1910, moving up to the rank of chief engineer. He served on the steamers Navigator and W. S. Porter of the Associated Oil Company, later going to the Standard Oil Company (Calif.) as a chief engineer. He was on the Standard Arrow during the war, with rating of lieutenant-commander.

For ten years Munro was with the Maintenance and Repair Division of the United States Shipping Board, part of this time working out of New York. He was in charge of the South Atlantic District, stationed at Jacksonville, for two and one-half years. He was transferred to the Pacific Coast in January, 1923, and remained here until that office was closed in October, 1928. At the time he was district Director. Munro is the holder of unlimited license for steam and diesel engines. His host of friends on the West Coast welcome him back to California ports.

John E. Ryan, general passenger manager for the Matson Navigation Company, reports greater interest being shown in Pacific tourist travel and who has great expectations for the coming summer.

CHARLES A. WINSLOW is now general manager of the Standard Gas Engine Company of Oakland, California. Winslow was formerly general manager of the Winslow Manufacturing Company, makers of Winslow carburetors, air cleaners, and oil filters. He is further known in marine engineering circles as co-designer, with Colonel E. J. Hall, of the Hall-Winslow line of oil filters and lubricating systems. He was most recently development engineer foi the Hercules Motor Corporation of Canton, Ohio.

At the helm of the Standard Gas Engine Company, Winslow is building up an organization comprising talent drawn from the heart of the automotive industry, and is taking advantage of his wide experience in automotive production methods, design, and manufacture.

Standard Gas Engine Company plans to continue manufacture of the Frisco Standard marine engine, and a program is under way for the manufacture of a line of diesel engines for the marine and industrial field.

JOHN THYSSE, formerly designing engineer for the Hercules Motor Corporation, is chief engineer of the Standard Gas Engine Company. Thysse received his training in Europe and was formerly with the Worthington organization and the Hill Diesel Engine Company.

Charles Winslow was one of the organizers of the Marine Gas Engineers Association, No. 47, in San Francisco, which later extended its scope to diesel engineers and which is now known as the Marine Engineers Beneficial Association, No. 49, Diesel Branch.

F. A. Bailey, vice-president and secretary of the Matson Navigation Company, home port, San Francisco.

Official News *of the* PROPELLER CLUB *of* California

Propellers "Get the Air" at San Francisco as World Ports Listen in for Spring Frolic of Salt Water Thespians....

By Speck Tator, *Chief of Schooner "Foam"*

THE versatile entertainment committee of the Propeller Club of California, headed by H. J. (Bert) Anderson, rang the bell again!

Wednesday night, May 13, the club went "on the air"—broadcasting 60 or more merry, melodious, mysterious minutes devoted to good-natured lampoons of popular radio acts. The "mystery" element prevailed in some sections of the audience, until far into the night. Other sharp-shooters concluded earlier in the festivities that the broadcast was "for internal use only"—but only after three-score members had phoned the folks at home to tune in on the fun. Bert and his arch-conspirators had reproduced most authentic studio atmosphere and equipment; and, with the help of Ralph Brunton of KJBS, Jerry Lalor had created a microphone and loud-speaker combination which was as real as real-estate.

The banqueteers were regaled with a fast-tempo band which lost its identity under the obvious "nom de mike" of The Fortunate Blow Orchestra. Promptly at 7:59 and 3/4's Pacific Standard Time, the red-light flashed, silence was observed, and the station went on the air.

Dick Glissman and Edgar Martin vied for honors in the first sketch, appearing as Little Ophelia, 5 years old, and Little Edna, 4½, in Aunt Fanny's Children's Hour. Bern DeRochie gave a good demonstration of versatility by doubling as a broadly feminine Aunt Fanny and a roughly masculine Big Brother Spike. His bed-time story was a classic.

A riotous act followed, bringing Albert Porter, Bert Anderson, and Louis Steiger before the microphone for an interview with Hon. Wo Hop, Chinese shipping magnate. Al's dignified interviewer, Bert's clever Chinese-American interpreter, and Louis' bland and loquacious Chinaman were the laugh hit of the evening. The audience roared at Hon. Wo's comments on San Francisco maritime personalities and waterfront affairs. "Lord Bilgewater," the guest-artist of the evening, was royally welcomed as became his rank and this personal appearance of the famous radio character—Monroe Upton away from the "mike"—was a pleasant addition to the program.

Came next Mel Reed, looking dark and dangerous despite his temporarily indispensable crutch; Emmett Britton as a black-skinned fireman; Dick Glissman in dungarees and soot; and Tom Short appearing as if he'd just come off watch—the Boiler Room Four—and how those boys harmonized! At least three of them were very, very good, and what more can you desire from a Black Gang Quartet. The boys got their laughs, too, working in topical words to familiar barber-shop melodies. Carl Lane was billed but his throat kicked up a row ahead of the show; too much rehearsal, no doubt. Carl was missed!

Amos 'n' Andy in person, with Brother Crawford and Kingfish Ralph Myers thrown in for good measure, made a decided hit. The taxi-cab office, theme song, and make-up of the boys were carefully planned and the atmosphere was perfect.

The sensation of the evening came with the last number, the Propeller Club's own hay-wire symphony! Seldom has this gray-haired reviewer witnessed such a spontaneous demonstration on the part of an audience. To use the parlance of the craft, "They had 'em in the aisles!"

Propellers will long remember Hughie Brown's "Red River Valley" and Pat Carney's "Wreck of Old 97." Jim Hines played a wicked banjo with such alacrity and abandon that he ended up, unphased, on three strings. Ollie Langton and Ed Martin were "fiddlin' fools," and Ollie's enraptured smile was the favored comment at the post-mortem.

Whether the audience or performers enjoyed the frolic the most is debatable. The certainty is that a good time was had by all and the radio "idea" was a worthy successor to previous Propeller performances staged by the Club's talent-discoverer, Bert Anderson.

The weekly luncheon get-togethers held in the refreshing atmosphere of the Commercial Club are gaining in interest and attendance. A record turn-out greeted Captain Louderback von Emden, who presented a striking narrative of sea-raiding covering his experiences during the World War. President Ralph Myers was on deck for this gathering and the audience included several maritime executives.

Other interesting luncheons during the month brought worth while features to The Propellers. Captain C. W. Fisher, U.S.N., of Mare Island gave a comprehensive talk on deepsea diving and submarine salvage work.

A number of extremely interesting movie films have enabled the membership to visit the American-Hawaiian, Panama Mail, and Matson ports of call; and the Haviside Company has projected excellent pictures of San Francisco Bay interest.

The surprise meeting staged by Chairman Bert Anderson gave those present the opportunity of "ballyhoo-ing" their own businesses; and on May 12 the club enjoyed an outline of secret service operations presented by Propeller Flynn.

The roll-call feature is a great "ice breaker," with Standard Oil vying with the Haviside organization for attendance honors.

O. C. Roehr, last year's chairman of the Maritime Commerce Committee of the Portland Chamber of Commerce. Admiralty lawyer—he is of the firm of Pendegrass, Wiggins, Barzee & Roehr.

COLONEL J. CARLETON BROWN was recently appointed Pacific Coast Manager of the Canadian National Steamships, Ltd., succeeding B. C. KEELEY, at Vancouver. Colonel Brown had been assistant to SIR HENRY THORNTON, chairman of the Canadian National Railway, specializing in matters pertaining to trade development between Canada, Australia, New Zealand, and the East Indies. He comes to the Pacific Coast from the East Coast, where he has been working with the Atlantic services of Canadian National Steamships, Ltd. Colonel Brown is a civil engineer. During the World War he saw service in France, Salonika, and Egypt.

HARRY S. EATON was recently elected president of the Portland Waterfront Employers Association for 1931. Eaton is district manager at Portland for the Luckenbach Steamship Company, having been with that line for nine years, six of which were at the San Francisco office. Prior to this he served seven years in the Portland, Seattle, and San Francisco offices of the Pacific Steamship Company. At one time he was with the Southern Pacific Company.

J. B. LEVISON, president of the Fireman's Fund group of fire and indemnity companies, has been reelected president of the Insurance Federation of California for the term May 1931 to May 1932, an office he has held for eight years.

RICHARD FLETCHER, foreman riveter of the Bethlehem Union plant, San Francisco, joined Ollie Langton in the hall of fame a short while ago. Fletcher took careful bearings on the 17th tee at Lincoln Park course, relaxed, prayed, and swung his trusty spoon. His hole-in-one carried 217 yards. Bob Jones, the old boy himself, couldn't have made it look easier! Fletcher's foursome, when they came to, proved to be PERCY COTTON, EUGENE ESSNER and "JIM" ROGERS of General Paint. "Easy, when you know how!" says "Fletch."

The personnel of the staff of the Canadian Pacific Line's new 42,500-ton flagship Empress of Britain, under command of CAPTAIN

Master of America's largest home-built liner — Captain Fred Anderson, who brings out the President Hoover under Dollar Line flag this August.

ROBERT GILLMORE (JOCK) LATTA, is as follows, according to an announcement by PRESIDENT E. W. BEATTY: CAPTAIN A. H. HALL, formerly staff captain of the Empress of Scotland, is staff captain of the Empress of Britain under Captain Latta; COMMANDER W. G BUSK-WOOD, D.S.C., R.N.R., is chief officer, previously being chief officer of the Empress of Australia; W. STANFIELD and B. GRANT are first and second officers, respectively, having transferred from the Empress of Scotland; CHIEF ENGINEER H. DONALD will control the destinies of what the Canadian Pacific claims as the world's most modern engine room; W. S. PEARCH is purser; DR. A. GARDNER is senior surgeon; and the chief steward is F. MOSS, formerly of the Empress of France.

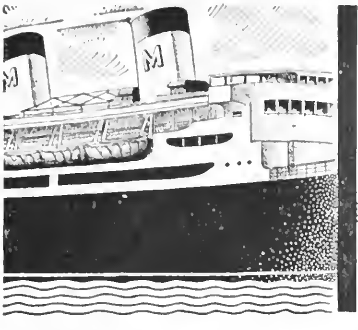
The Empress of Britain is the largest and fastest liner plying between any two British ports.

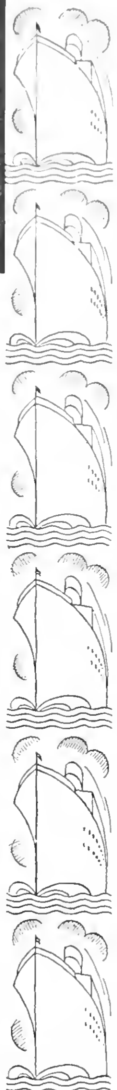
ROGER MURRAY of Fairbanks, Morse & Company has been transferred from Salt Lake City to the San Francisco office as manager of the diesel engine department. Murray is directing the activities in the stationary diesel field. HOWARD OXSEN is supervising marine diesel work in the San Francisco District.

HOBART W. MEARS, purchasing agent of the Matson Navigation Company, recently returned to his home port, San Francisco, from Vancouver and Seattle. Mears is president of the California Association of Purchasing Agents, and attended the district council session in British Columbia.

CAPTAIN AMON ANDERSON, commanding officer of the United States Bureau of Fisheries boat Penguin, died of heart failure May 4 at Unalaska. He was sixty years old. Captain Anderson had commanded the Penguin and her predecessor, the Eider, for the past five years in patrol and fisheries service from Dutch Harbor to the Pribilof Islands. Captain Anderson had followed the sea for many years, and in his earlier days was in the transatlantic service.

Heading the Portland Waterfront Employers Association for 1931 — Harry S. Eaton, veteran Pacific Coast shipping expert.





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FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, and Honolulu to San Francisco, and Los Angeles Harbor.

Atlantic - Far East

WEEKLY SAILINGS from New York, FORTNIGHTLY from Boston to Honolulu, Yokohama, Kobe, Shanghai, Hongkong, and Manila.
FORTNIGHTLY SAILINGS from Manila, Hongkong, Shanghai, Kobe, Yokohama, Honolulu to New York and *Boston.
*Transhipment New York

Mediterranean - U. S. A.

FORTNIGHTLY SAILINGS from Alexandria, Naples, Genoa, and Marseilles to New York, Boston, Los Angeles Harbor, San Francisco. Cargo destined Oakland, Portland, Seattle or Vancouver subject to San Francisco transhipment.

Round-the-World

FORTNIGHTLY SAILINGS between Boston, New York, Havana, Colon, Balboa, Los Angeles Harbor, San Francisco, Honolulu, Kobe, Shanghai, Hongkong, Manila, Singapore, Penang, Colombo, Suez, Port Said, Alexandria, Naples, Genoa, Marseilles, thence New York.

Trans Pacific Freight Service

TRI-MONTHLY SAILINGS between Los Angeles Harbor, San Francisco, Pearl Harbor, Guam, Manila, Cavite, Iloilo, Cebu and other ports as inducement offers.

Intercoastal

WEEKLY SAILINGS from New York, FORTNIGHTLY from Boston to Los Angeles Harbor and San Francisco.
FORTNIGHTLY SAILINGS from San Francisco and Los Angeles Harbor to New York.
Cargo destined or shipped from Oakland, Portland, Seattle or Vancouver subject to San Francisco transhipment.

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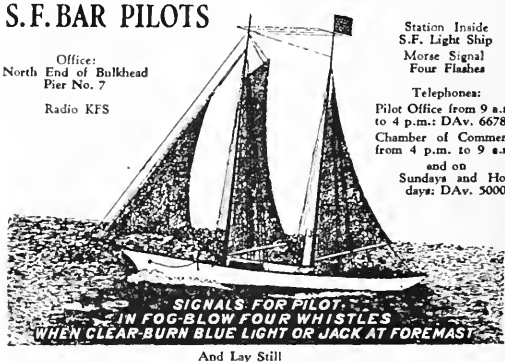
North End of Bulkhead
Pier No. 7

Radio KFS

Station Inside
S.F. Light Ship
Morse Signal
Four Flashes

Telephones:
Pilot Office from 9 a.m. to 4 p.m.: DAv. 6678-9
Chamber of Commerce from 4 p.m. to 9 a.m. and on Sundays and Holidays: DAv. 5000.



And Lay Still
When on Station under Sail a White Light is carried at Mast Head.
When under Power, a Red one under White; a Flare or Torch is also burned frequently.

R. J. RINGWOOD, freight traffic manager of the Panama Pacific Line, announces the appointment of two general freight agents for California in the new Pacific Coast organization which on June 1 took over the line's freight business from agency management.

CHARLES W. HURST will handle the Northern California district, with headquarters in San Francisco; and HARRY G. ADAM will be located in Los Angeles, caring for the southern territory.

For the past two years Hurst has been assistant to the Pacific Coast representative of the Intercoastal Conference, in charge of weighing and inspection of cargo in transit over conference lines. Prior to that he was for eight years with the American-Hawaiian Steamship Company in charge of rates and tariffs, as assistant to the traffic manager. Earlier he was for six years with the Southern Pacific in various capacities, the latter part of his service being in the foreign freight department. Hurst is a native of Missouri and 33 years old. He served in the navy during the World War.

Harry G. Adam has been in the steamship business on the Pacific Coast since 1917, when he entered the employ of the Matson Navigation Company at San Francisco. He served with that line in various capacities until 1925, when he joined the staff of Swayne & Hoyt, Inc., in charge of billing. Promotion to the position of assistant traffic manager, and short service at Portland, Oregon, was followed by transfer to Southern California as district manager at Los Angeles. In September of last year Adam was transferred to San Francisco as general agent. He is a native of Cambridge, Mass., and is 31 years old.

L. E. ARCHER, Pacific Coast traffic manager of the International Mercantile Marine Company, announces the appointment of A. G. ALBERTSEN as general passenger agent for northern California, with headquarters in San Francisco, and W. F. OHLSON as general passenger agent for Southern California, with headquarters at Los Angeles. These designations conform to the company's system of titles in its New York organization and elsewhere. Albertsen has been assistant to Archer for the past five years, and Ohlson in charge of the Los Angeles office.

CHARLES D. CLARKE, well-known San Francisco shipping official, passed away on May 21 in San Francisco. Prior to retirement in February of this year, Clarke had been vice-president of the California Transportation Company, operating a fleet on the Sacramento and San Joaquin rivers. He was an executive of the California Navigation and Improvement Company for thirty years, until the company was merged in 1927 with the California Transportation fleet. Surviving Clark is his widow, Mrs. Grace E. Clarke, and two sisters, Gertrude and Harriet Clarke, of White Plains, New York.

Now Pacific Coast manager for Canadian National Steamships, Ltd.—Colonel J. Carleton Brown — recently promoted by his line.

PAUL CHANDLER, manager of the Marine Department of the Los Angeles Chamber of Commerce, recently visited San Francisco and broke bread with ABE MARKS, manager of the Marine Department of the San Francisco Chamber of Commerce, aboard the launch Jerry Daily on San Francisco Bay. What the manager from the South said to the official from the north is not in the dispatch, but remarkable tonnage figures most certainly took wings. Chandler is a former San Franciscan. Ten years ago he was with the Luckenbach organization.

JOHN CORDES, of the firm of Cordes Brothers of San Francisco and Los Angeles Harbor, has been appointed owner's representative to supervise construction of the San Diego & Coronado Ferry Company's new automobile ferry San Diego. The keel for this job was laid May 27 at The Moore Dry Dock Company yard in Oakland.

San Francisco's Third Annual Steamship Golf Championship will be held Tuesday, June 9, at the Lakeside course of the Olympic Club. A beautiful array of trophies will be on for the various flights. Prizes will also be awarded for winners of the guest's flight. The prizes will be presented at a banquet at the club house.

Here are the shipping officials heading the committees:

HUGH GALLAGHER, general chairman;

ROGER LAPHAM, honorary chairman;

Course and Entertainment, W. J. EDWARDS, A. S. GUNN, THOMAS CROWLEY, RALPH G. SULLIVAN.

Membership, W. C. EMPEY, RALPH W. MYERS, JOHN T. GREANY.

Prizes, FRANK O'CONNOR.

Treasurer, H. J. ANDERSON.

Secretary, AL PORTER.

JOHN ALSOP, formerly in charge of the Royal Mail Steam Packet Company offices in New York, has been appointed Pacific Coast agent, succeeding J. J. McGowan. His headquarters will be in Seattle.

FRED H. REESE, for the past years affiliated with the Pacific Steamship Company, on May 15 began his new work as field representative of the marine department of the Portland Chamber of Commerce. Reese was appointed by L. W. HARTMAN, newly elected president of the organization. Reese's activities are similar to those of a freight traffic agent for a steamship line, his mission being to increase the volume of cargo moving through Portland. Hartman, the president-elect of the Portland Chamber, is vice-president and Portland manager for J. T. Steeb and Company, customs brokers.

Carroll Single, until recently a member of the firm of Single and Single of New York, has returned to San Francisco and opened offices for the general practice of law at 465 California Street.

Rule & Sons, Inc., formerly a coast-wide brokerage firm, has disposed of its branch offices at San Francisco, Portland, and Seattle, and will confine its efforts to Los Angeles. The branch offices were sold to Cosgrove & Co. in San Francisco, Campbell & Hall in Portland, and La Bow, Haynes & Ball in Seattle.

Book Reviews

THE MODERN STEAM TURBINE.

By Dr. E. A. Kraft. 201 pages, 7 x 10, with 250 illustrations, neatly bound in dark green cloth with gold stampings; published by VDI-Verlag, Berlin, Germany.

"A critical survey, founded on practical experience of the most important problems of the day in the turbine industry," this book presents the present practice and trends of turbine design and construction in America and in Europe. Dr. Kraft is honorary professor of steam engineering at the Charlottenburg Technical University and Director of the A. E. G. Turbine Works at Berlin. The first German edition of this book was published in 1926. The present English edition is not a translation, but an original English edition brought out in Germany with all material and illustrations brought up to date (March, 1930), and all obsolete ideas and details deleted. "Illustrations of turbine sections and detail drawings have been shown as clearly as possible, for secret designing is not the true way to progress" and the purpose of this treatise on turbines is that the reader, be he "designer, purchaser, or scientist, may acquire a deeper knowledge of the latest problems of steam turbine construction and a clearer understanding of the practical values of the new ideas."

BRITISH SHIPPING FINANCE.

1931. 640 pages, with numerous tables, neatly bound in red cloth; published by Fairplay, London. Price 15s 9d, net, including postage.

This is Fairplay's annual survey of British shipping conditions. It contains a summarized statement of the balance sheets for the last four years of more than 1000 British ship operating companies; lists of directors and shareholders of 650 British Companies, capitalized at an aggregate of 274,500,000 pounds Sterling; shipping share quotations; statistics on the British shipbuilding, ship repairing, and marine engineering situation; financial position of British marine insurance companies; ship sales of 1930; and coal and oil bunker prices for several years. In short, this book gives a complete, up-to-date, statistical picture of British shipping and should therefore be of great interest to anyone interested in world commerce.

MODERN DIESELENGINE PRACTICE. By Orville Adams. 650 (6x9) pages; over 400 engravings; published by the Norman W. Henley Publishing Co., 9 West 45th Street, New York. Price $6 net.

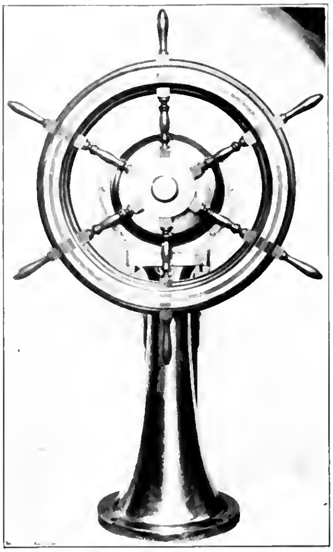
This book, one of the most complete on the subject yet published, was prepared to combine a text for study and reference and a practical manual on operation and repair in one volume. It includes instructions suitable for the owner, operator, repairman, and engine salesman, and is also valuable to all students. Every fact requisite to a complete knowledge of diesel engine construction, operation, and maintenance is included, presented in nontechnical language.

High speed oil engines of recent design for all mobile applications, such as shovels, dredges, draglines, industrial and railroad locomotives, and tractors are shown. Several chapters with layout drawings consider the stationary diesel engine. All auxiliaries, air filters, pyrometers, exhaust silencers, and centrifuges are described and illustrated. The instructions on lubrication, maintenance, operation, and repair of engines are unusually complete.

Hydraulic Telemotor for Yacht

COX and STEVENS, architects for yacht Avalon, gave considerable thought to the best means of controlling the steerer from the pilot house. A hydraulic telemotor was finally selected. Previously, wire rope and shafting had been considered. With wire rope it was found necessary to install a number of sheaves of a size large enough to carry the rope without excessive wear at the bends. The obligation of keeping the rope taut, possibility of breakage and lubrication were not advantageous to this system. Shaft control was next considered. To avoid various obstructions, many pairs of gears and universal joints were needed between pilot house and steerer. Other difficulties realized were slack in the gearing and the problem of bracing the shafting in order to eliminate binding in the gears.

The initial cost of the hydraulic telemotor was at first thought to be a large factor against it. However, it was found that 3/8-inch tubing could be run from the wheel to the after telemotor, eliminating not only the gears, sheaves, brackets, universals, and rope, but the expense of installing them. The saving in the cost of installation more than offset the added cost of the telemotor.



New yacht steering wheel and stand fitted with American Engineering Company hydraulic telemotor.

Both forward and after telemotors are of a new design, developed especially for yachts by the American Engineering Company. Both are built on the same principles as the larger A-E-CO units so successfully used by commercial craft, and, with the Type "S" automatic equalizing valve furnished by the manufacturers, are thoroughly reliable. The plungers and cylinders of the forward telemotor are concealed behind a polished bronze column of graceful lines. A new feature, an indicator visible to the wheelsman, travels across the driving head, marking the position of the rudder at any time.

New Auxiliary Propulsion Plant

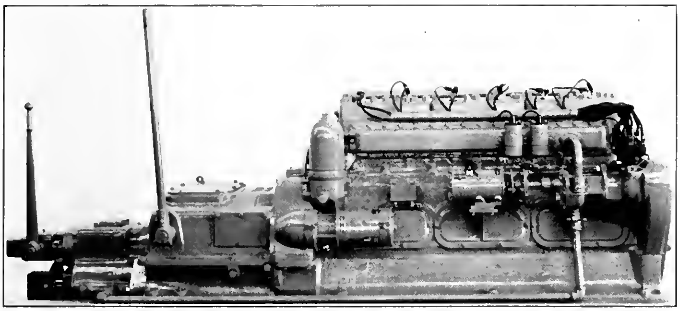
A NEW development has been added to the Sterling Petrel reduction gear gasoline engine for sailing craft. As shown in the illustrations, this consists of an extension of the gear case and a second lever. This lever operates a sliding draw clutch which places the main drive pinion of the reduction gear in a neutral position, thus allowing the propeller and its shaft to spin freely and so eliminate the drag of the propeller blades.

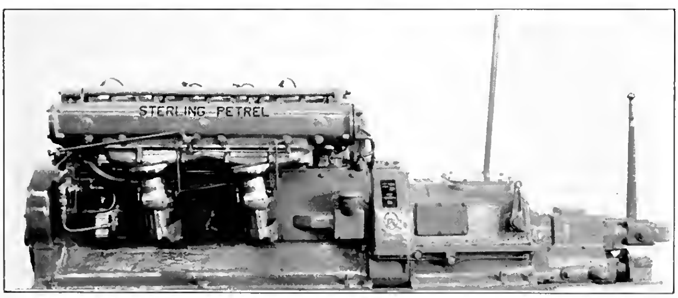
The use of this clutch, in combination with the Sterling planetary reduction gear on Petrel engines, makes an ideal auxiliary propulsion plant for sailing yachts or allows efficient use of sail power in a cruising yacht.

The Petrel reduction gear engine has not been changed internally for more than two years. Some of these engines have been in practically constant service during that period and have demonstrated their ability to produce their rated power capacity consistently, quietly, and without strain.

The engine has six cylinder, $5\frac{1}{2}$-inch bore, 6-inch stroke. Its rating is 180 horsepower at 1800 revolutions per minute. With the 3 to 1 reduction gear, it easily handles a 36-inch propeller at 600 revolutions per minute and will drive a 90-foot boat of reasonably fine lines at $15\frac{1}{2}$ miles an hour.

In some 60- to 75-foot cruisers, twin installations of the Sterling Petrel reduction gear motors have operated at 1500 revolutions per minute engine speed, equivalent to 13 miles per hour boat speed on a fuel consumption of approximately one gallon of gasoline an hour.





Starboard and port views of the new Sterling Petrel reduction gear gasoline engine fitted with idling clutch.

BUYERS' GUIDE AND MARINE DIRECTORY

Marine Engines.
(See also Engines, Oil.)
Bethlehem S. B. Corp., Ltd
Busch-Sulzer Bros. Diesel Engine Company.
Ingersoll-Rand Company.
Newport News S.B & D.D. Co.
Union Gas Engine Co., Inc.
Washington-Estep—W. H. Worden.
Western Machinery Company.
Worthington Pump & Machinery Corporation.

Marine Glue.
L. W. Ferdinand & Company.

Marine Insurance.
(See Insurance.)

Marine Railways.

Marine Radio Sets.
Federal Telegraph Company.

Marine Repairs.
Bethlehem S. B. Corp., Ltd.
Commercial Iron Works.

Marine Repairs (Electrical).
Lalor Electric & Eng. Co., Ltd.
Chas. J. Henschel & Co., Inc.
Ets-Hokin & Galvan.

Metallic Packing.
(See Packing.)

Meters, Water and Oil.
Worthington Pump & Machinery Corporation.

Mattresses.
The Simmons Company.

Mooring Fixtures and Engines.
Dake Engine Company.
Hyde Windlass Company.

Motors
Diehl Manufacturing Co.

Motors, Electric.
B. F. Sturtevant Company
General Electric Company.
Westinghouse Elec. & Mfg. Co.

Multicoil Evaporators, Heaters, Distillers.
Griscom-Russell Company.

Multiwhirl Oil Coolers.
Griscom-Russell Company.

Nautical Instruments.
Ford & Geirrine, C. V. Lane.
The Sperry Gyroscope Company.

Naval Architects.
D. W. Dickie.

Nipples.
The Lunkenheimer Company.

Nitrogen, Gas.
The Linde Air Products Co.

Oakum.
Geo. Stratford Oakum Co
Weeks-Howe-Emerson Company.

Oil.
(See Lubricants.)

Oil Burners.
The Babcock & Wilcox Co.
Coen Company.
Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane.
W. S. Ray Mfg. Co.
Vaughn, G. E. Witt Co.

Oil Burning Installations.
The Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Coen Company.
Ford & Geirrine, C. V. Lane.
W. S. Ray Mfg. Co.
Vaughn, G. E. Witt Co.

Oil Burning Control Systems.
Vaughn, G E. Witt Co.

Oil Burning Pump and Heater Sets.
Babcock & Wilcox Co.
Bethlehem Shipbuilding Corp., Ltd.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane.
Chas C. Moore & Co., ENGINEERS.
Western Engineering Company.
Vaughn, G. E. Witt Co.

Oil Coolers.
Davis Engineering Corporation.
The Griscom-Russell Company.
Western Engineering Company.

Oil Cups
The Lunkenheimer Company.

Oiling Devices.
Ford & Geirrine, C V. Lane.
The Lunkenheimer Company.

Oil Fuel.
Associated Oil Company
Standard Oil Company.
Shell Oil Company
The Texas Company.
Union Oil Company.

Oil Fuel Apparatus.
Babcock & Wilcox Co.
Coen Company.
Chas. C. Moore & Co., ENGINEERS.
Ford & Geirrine, C. V. Lane.
Vaughn, G. E. Witt Co.

Oil Gauges
The Lunkenheimer Company.

Oil Purifiers.
De Laval Separator Company.
Sharples Specialty Company.

Oil Reliquification Systems.
Davis Engineering Corporation.
Western Engineering Comoany.

Oil Separators.
Bethlehem Shipbuilding Corp., Ltd.
De Laval Separator Company.
Ford & Geirrine, C. V. Lane.
The Babcock & Wilcox Co.
Sharples Specialty Company.
Western Engineering Company.

Oil, Steam Cylinder.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co.
The Texas Company.

Oil, Turbine.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co.
The Texas Company.
Union Oil Co.

Oronite Paints.
Standard Oil Company.

Oxy-Acetylene Apparatus.
Oxweld Acetylene Company.

Oxygen, Gas
Linde Air Products Company.

Packing
Crane Packing Company
France Packing Co.
Plant Rubber & Asbestos Works
C. E. Rhodes Co.
Thorkote Products Co., Inc.

Packing, Metallic Condenser
Crane Packing Company.

Packing, Metallic.
Crane Packing Company.

Paint.
Federal Comp. and Paint Co., Inc.
L. W. Ferdinand Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.

Paint, Stack.
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand & Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.

Paint, Waterproof.
Federal Comp. & Paint Co., Inc.
L. W. Ferdinand & Company.
Fuller Company, W. P.
Hill-Hubbell Co.
International Compositions Company.

Paneling.
Haskelite Mfg. Corporation.
The Pantasote Company, Inc.

Pipe Covering, Cork
Armstrong Cork & Insulation Co.

Pipe Unions.
The Lunkenheimer Company.

Plumbing, Marine
A. B. Sands & Son Co.

Plumbing (Fixtures), Enameled, Vitreous China, Brass.
A. B Sands & Son Co.

Propellers.
Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane.
Hyde Windlass Company.
Warman Steel Casting Co.

Presses.
(See Forging Presses.)

Propeller Shaft Sleeves.
The Paper & Textile Machinery Co.

Pumps.
Davis Engineering Corporation.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
Hyde Windlass Company.
Ingersoll-Rand Co.
Kearfott Engineering Co., Inc.
Northern Pump Company.
Western Engineering Company.
Worthington P. & M. Corp.

Pumps, Ballast.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps, Bilge.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps, Boiler Feed.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps, Centrifugal.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corporation.

Pumps, Circulating.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.
Westinghouse Elec. & Mfg. Co.

Pumps, Deck.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.

Pumps, Electric.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps, Electric-driven.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation

Pumps, Fuel Oil.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Vaughn, G. E. Witt Co.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps, Gasoline.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.

Pumps, Hand Oil.
The Lunkenheimer Company.

Pumps, Oil.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Worthington Pump & Machinery Corporation.

Pumps, Rotary.
Ford & Geirrine, C. V. Lane.
Northern Pump Company.
Vaughn, G. E. Witt Co.
Worthington Pump & Machinery Company.

Pumps, Sanitary.
Fairbanks, Morse & Co.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
Western Engineering Company.
Worthington Pump & Machinery Corporation.

Pumps (Vacuum).
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Northern Pump Company.
The Sperry Gyroscope Company.
Worthington Pump & Machinery Corporation.

Purse Seines.
Cunningham, Allan.

Purifiers.
Ford & Geirrine, C. V. Lane.

Radio Apparatus.
Radio Marine Corp.
Mackay Radio Tel Co.
Ets-Hokin & Galvan.

Reducing Gears.
(See Gear.)

Refined Oils.
Associated Oil Company.
Standard Oil Company.
The Texas Company.

Refrigerating Machinery.
(See Ice Machines.)

Regulators (Pressure).

Riggers.
Vaughn, G. E. Witt Co.

Ring Buoys
Armstrong Cork Company.

Rings, Piston.
Kearfott Eng. Co., Inc.
Haviside Company.

Roofing Paints.
L. W. Ferdinand & Company.

Rope.
(See also Wire Rope.)
Columbian Rope Company.
Durable Wire Rope Company.
Griscom-Russell Company.
Portland Cordage Co.
Tubbs Cordage Co.

Rudder Angle—Indicator.
Lalor Electric & Eng. Co., Ltd.
Chas. J. Henschel & Co., Inc.
The Sperry Gyroscope Co.

Running Light Panels.
Lalor Electric & Eng. Co., Ltd.
Chas. J Henschel & Co., Inc.
General Electric Company.

Sails.
Haviside Company.

Scuttle Butts.
Brunswick-Kroeschell Co.
Frick Company.

Searchlight Control Gear.
Sperry Gyroscope Company, Inc.

Searchlight, High Intensity.
General Electric Company.
Sperry Gyroscope Company, Inc.

Searchlights (Low Intensity).
Ets-Hokin & Galvan.
General Electric Company.

Separators (Steam, Air & Oil).
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
The Babcock & Wilcox Co.

Ship Agents and Brokers.
Page Brothers.
Bethlehem S. B Corp., Ltd.

Ship and Boat Builders.
Bethlehem S. B. Corp., Ltd.
Morse Dry Dock & Repair Co.
Sun Shipbuilding Co.
Todd Dry Docks Corporation.

Ship Bottom Paint.
Federal Comp. & Paint Co., Inc.
International Compositions Co.

Ship Construction Systems.
J. W Isherwood.

Ship Lighting.
(See Electric Fittings and Supplies.)

Ship Chandlers.
(See Hardware and Ship Chandlery.)

Soot Blowers.
Diamond Power Specialty Corp.

Springs.
The Simmons Company.

Steam Engines.
(See Marine Engines.)

Steamship Companies.
(See Transportation.)

Steam Specialties.
Griscom-Russell Company.
Kearfott Engineering Company.
The Lunkenheimer Company.
Vaughn, G. E. Witt Co.

Steam Traps.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane.
Vaughn, G. E. Witt Co.

Pacific Marine Review

JULY 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | JULY, 1931 | NUMBER 7

Contents

Official Organ Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

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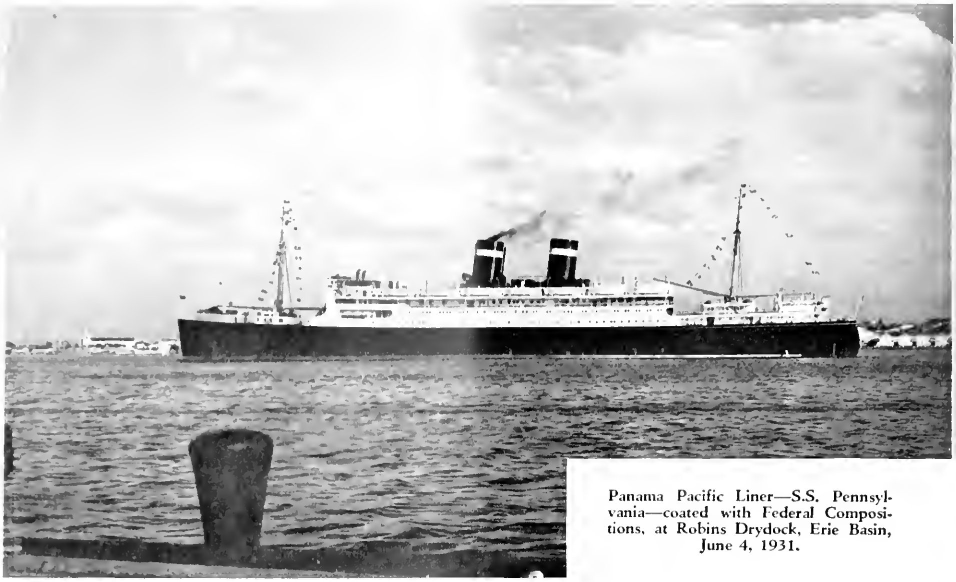
Official Organ Shipowners' Association of the Pacific Coast

Alexander J. Dickie, Editor.

Paul Faulkner, Advertising Manager.

Chas. F. A. Mann, Northwestern Representative, 1413 Puget Sound Bank Bldg., Tacoma, Washington.

Pier No. 7, Manila, Philippine Islands, with five large ocean liners alongside. Dollar liner President Fillmore and Canadian Pacific liner Empress of Australia are at outer berths left and right. This is the largest commercial pier under the American Flag



Panama Pacific Liner—S.S. Pennsylvania—coated with Federal Compositions, at Robins Drydock, Erie Basin, June 4, 1931.

Pacific Marine Review

VOLUME XXVIII JULY, 1931 NUMBER 7

Editorial Comment » » »

Tuning up the Operating Staff

DURING the past twenty-five years industry in Europe and America has been learning much about the application of psychology to personnel problems. Under widely varying circumstances and in many instances, such application has greatly improved the morale, comfort, safety, and health of the worker and has increased the output at decreased cost. More recently a few American and European ship operators have been applying the same methods to personnel management aboard ship, and these operators likewise report astonishing results.

The operating manager of a line of vessels has the same problems as the operating manager of a public utility or transportation manager ashore, with some added for good measure. Chief among the additional problems of marine transport management is the large proportion of time during which his operating plant and personnel are removed from his direct contact, inspection, or supervision. It is just because of this factor that such astonishing results are obtainable by the application of common sense psychological principles to personnel management afloat.

In a recent speech delivered before the Propeller Club of Boston, H. Harris Robson, manager of the cargo and passenger fleet of the United Fruit Company, tells of some very remarkable results obtained through introducing some very simple principles of psychology into the personnel management of his fleet. Prior to the introduction of these principles, a thorough study had been made covering all phases of operation and of personal contacts aboard these ships. The resulting scheme involved:

1. Careful training of the personnel in the best methods of utilizing the existing equipment on each ship.
2. A thorough impression on minds of crew and officers as to the kind and quantity of results expected and their individual and collective responsibility therefor.
3. Establishment of close personal contact between the management and all grades of personnel aboard ship.
4. Information to every ship of fleet at regular intervals as to the performance of that ship and of all the others.
5. Ability and results made the sole criterion of advancement.

This scheme was put into effect in 1924 for the deck and engine room departments, and almost immediately results began to show. In fuel economy the improvement was progressive, in 1925 making a saving of 3.8 per cent. and in 1930 a saving of 34.2 per cent. as compared with 1924. These percentages are as of quantities and do not take price into consideration. The fuel quantities compared are for all purposes, including port use. During the same period the maintenance and supply costs for deck, engine, and refrigerating departments showed a reduction of 9 per cent., while the average speed of the vessels showed a slight increase from 11.76 in 1924 to 11.80 in 1930.

On identical sister ships in 1924 there was a difference between the worst and the best ship of 14,392 barrels of fuel oil per year. By 1930 this difference had been reduced to 2425 barrels, and the ship that had been the worst in 1924 was showing a saving of 32,000 barrels a year as compared with her 1924 consumption. With two sister ships on the same run, one making a poor and the other a good record on fuel and speed, the entire personnel of officers and crew was switched, and almost immediately the records of the two ships were reversed.

In 1929 these methods were applied also in the steward's department, and a similar decrease in cost and improvement in morale is being demonstrated.

These are substantial cash savings in operating costs, but the indirect savings and added attractiveness of the service due to greater safety of operation and better morale of crews are probably of equal importance.

The Personal Equation at Sea

THE natural foundation for a ship is sea water. Any well found, shipshape, modern, seagoing steamer or motorship is safe so long as she has plenty of water under her keel, plenty of fuel in her bunkers, a competent navigator on her bridge, and a well trained and disciplined crew at their various stations. Naval architects have provided a safe, commercial, seagoing hull. Marine engineers have provided dependable and economical steam generators, prime movers, and auxiliary machine[illegible] lurgists have provided strong, corrosion[illegible] materials for every necessary purpose. Chem[illegible] provided protective coatings. Every branch of [illegible]ing and science has contributed to that compo[illegible]vel— the modern passenger and cargo vessel with the net result that to-day sea transport of passengers and cargo is the safest and most economical method known to man. In fact the only real danger to a modern vessel at sea is that uncertain quantity, the "Personal Element."

Let a vessel be supplied with every effective equipment for safeguarding the navigation of her hull or for maintaining the economy of her propulsion plant, or for aiding the comfort and peace of mind of her passengers —and yet she will surely go ashore or be a hog for fuel, or achieve a bad reputation among the traveling public —unless her navigating officers, her engineers, and her stewards are constantly on the alert to intelligently use the equipment with which she is provided.

One of the worst phases of the personal element factor is the almost universal tendency in the human mind to get careless in the matter of simple routine. This is particularly evident in comparatively short coastwise runs where its results are most dangerous. The crews of coastwise passenger vessels on fast schedules, running up a record of one thousand two thousand round trips without incident, should be watched very carefully to see that they are alert and are constantly using and gaining confidence in the equipment that at any moment in an emergency may be the means of saving not only the ship but all her passengers.

This is particularly true of navigation equipment. A number of rather serious stranding disasters have occurred because of lack of confidence in radio bearings and or the failure to use other automatic safety devices. It seems to us that operating management having provided these safe navigation devices should formulate some plan for their constant use and devise adequate checking systems to insure the application of that plan. At sea, as everywhere else, we are being continually reminded of the truth of the old adage, "Eternal vigilance is the price of success—and of safety."

The World's Greatest Menace

By R. Caygill

I've killed more men than all the wars, though frightful they have been
I've ruined more lives and wrecked more homes than drink or plague has seen.
I've spared no one, the rich, the poor, they're all alike to me,
The young, the old, the weak, the strong, whatever they may be.
I cast my shadow everywhere, in city, town, or farm;
You'll always find me lurking round where I can do most harm.
Even the little tots at school, so innocent and gay,
I've stricken by my power, because they crossed my way.
In aeroplanes, in motor cars, or on the ships at sea,
At home, or in some foreign land—it's all the same to me.
Widows and orphans know me well, I've caused them many a pain,
And you can take my word for it, I'll do the same again
Yet, strange to say, my strength is known, they've printed signs "BEWARE!"
"LOOK OUT!" for me and other things, but no one seems to care
So I go on my merry way, whilst others pay the cost,
And every day, and every hour, through me some lives are lost.

A prince of robbers too I am, in fact I have no peer,
I steal more than three hundred million dollars every year.
I give to none, I take from all, I crush, I maim, I kill,
And do my work relentlessly and also with much skill
Millions of cripples have I made, to ALL I bring distress,
This is my daily work in life my name is

CARELESSNESS.

(News Letter, Marine Section,
National Safety Council.)

Pacific Foreign Trade Convention

ANNOUNCEMENT of the Eighth Annual Convention of the Pacific Foreign Trade Council has been issued by its President, A. F. Haines, vice-president, American Mail Line of Seattle. Oakland, California, is to be the hostess city this year, and the dates will be September 17 and 18, 1931. These dates will form the nucleus of a Foreign Trade and Transportation Week in the San Francisco Bay district, as the Pacific Westbound Freight Conference has arranged to convene in San Francisco on September 14 and 15, and the Pacific Southwest Regional Advisory Board of the American Railway Association will call its members together on September 16 in San Francisco.

Interest and participation in trade conferences of this kind increase each year with the growth of Pacific Coast commerce. Last year the Pacific Coast carried on a billion dollars worth of foreign trade, which is one-eighth of the amount credited to the entire country. Of both foreign and domestic trade it handled 84 million cargo tons, or one-seventh of the nation's waterborne commerce. An industry of this size places responsibilities on the business men of the section which can only be handled through co-operation and discussion of the problems confronting them.

The decrease in trade with China resulting from the decline in silver exchange is of direct interest to the Pacific Coast of North America as affecting one of its principal markets. The Pacific Foreign Trade Council, a confederation of Chambers of Commerce and Boards of Trade of the Pacific Coasts of Canada, United States, and Mexico, at its convention this fall will afford an opportunity for analyzing the situation and making plans for a rehabilitation of that trade.

Shipping interests are concerned with the present surplus of ship tonnage, which will be a subject for discussion. Passenger travel will have more prominent attention than heretofore. The pioneer stage of encouraging travel up and down the Pacific Coast has passed, and now is the time for laying plans to expand these efforts to include transpacific travel.

The use of highways and air service in commercial transportation will be of general interest. Agriculture and mining are more or less affected by general trade conditions and discussions will be held to take stock of their situation. These are a few of the topics to be covered at the Pacific Foreign Trade Council convention in Oakland, September 17 and 18.

The Pacific Foreign Trade Council functions through foreign trade departments of Pacific Coast chambers of commerce. Its convention information is made available through those organizations at Seattle, Portland, San Francisco, Oakland, Los Angeles, San Diego, Honolulu, Vancouver and Victoria, British Columbia.

American Bureau for Pleasure Craft

THE American Bureau of Shipping, the official classification society for all vessels owned by the United States Government, is considering the expansion of its technical staff to include a division for the classification of pleasure boats, according to Captain C. A. McAllister, president of the Bureau.

Under the proposed plan, the American Bureau of Shipping will extend its services to include the yachting and motorboating fields and will offer the technical services of its representatives in building done by those branches of the industry Heretofore, the Bureau has confined its activities mainly to the commercial marine division of shipping where it is now classifying all of the larger vessels under construction in this country.

It has, however, supervised the construction principles of some major yachts, including J. P. Morgan's new Corsair and Cyrus H. H. Curtis' Lyndonia. It also has gained recognition from the New York Yacht Club whose racing rules state that "for all yachts built in accordance with the tables of scantlings provided by the Club, the construction shall be certified to by Lloyd's Register of Shipping or by the American Bureau of Shipping."

The Bureau, organized in 1862, has a membership composed of more than 100 shipowners, shipbuilders, underwriters, and persons prominently identified with maritime commerce in the United States. Altogether, there are 27 offices throughout the country, and there are technical men available in all major cities.

As it has done in its main operations, the Bureau proposes to examine plans, recommend practices, and supervise tests as a neutral organization. For this purpose, it has on its technical staff a number of graduates of Massachusetts Institute of Technology, the Webb Institute of Naval Architecture, and the School of Architecture at the University of Michigan. Because most of them have had actual experience in yacht designing, Captain McAllister believes the Bureau can make the necessary expansion very readily.

"We have considered such a division of the American Bureau of Shipping for the past ten years," Captain McAllister stated, "and we think that the experience gained in our previous work will be of great value to the stock boat builders and to the large number of yachtsmen in this country. It is our proposal that the regulations under which boats will be constructed shall be agreed upon by the designers and builders, the underwriters, and the technical experts of the bureau. We are quite aware that most boats constructed now are built according to the most acceptable practices, and we think that the manufacturers should be given the benefit of classification so that the claims they make might be established as against similar claims made by builders of less experience."

Twenty-five Years Ago

One of the British Columbia deputy shipping masters at the Port of Vancouver was Horace Sims, who was also apparently senior partner of Sims & Levy, sailors' boarding house masters at Port Townsend, Washington. Sims secured his appointment at Vaucouver on the promise that during his term in office his firm would be "less active in securing desertions of crews on vessels loading in Burrard Inlet, which crews would afterward reappear on vessels outbound from Ports on Puget Sound."

A Sailors' Union strike at this time had tied up the San Francisco waterfront and was extending to Portland and Puget Sound, although "we venture to say that in no part of the world does maritime labor receive such large returns, in addition to which the scale of victualling has risen very much the last few years, the present cost of feeding a sailor in the manner demanded by the walking delegate being about 66 cents a day as against 45 cents a year or two ago."

Stop Profitless Merchandising

(Final Declaration of the 18th National Foreign Trade Convention)

THE most significant fact in the status of the international trade of the world is that the volume of merchandise sales about equals that of a few years ago when business was enjoying substantial prosperity. But price levels have fallen to the point where profit has been largely eliminated. The chief factor of the present situation is profitless merchandising.

An essential necessity of the present economic situation is an advance in commodity prices. When prices are falling buyers tend to withdraw from the market. It is rising prices that stimulate buying and consumption and a return of prosperous times. Anything, therefore, which tends to postpone recovery in commodity prices, more especially those influences which are unfair and uneconomic in character should be discountenanced.

The importance of fair prices cannot be overestimated in influencing the restoration of trade. Sellers cannot expect to obtain fair prices for their own products unless as buyers they are willing to pay fair prices for the commodities and services necessary to their industry. Competition is unfair both to industry and to the community when price cutting compels the sale of goods at a loss. Basic commodities are being sold at cost or less. Profitless merchandising retards prosperity, and affects the position of the wage earner.

Our foreign trade is susceptible to world conditions but it should be possible to stabilize our domestic market which would have a strong stabilizing influence in other countries.

No one contemplating the vast resources of the United States; the basic soundness of our institutions; our financial and industrial integrity, which so powerfully has sustained our country in the perplexing and trying period through which we have been passing; our creditor position in the world; our unimpaired efficiency and economic strength; and the splendid morale of our people can have any doubt that we possess in ourselves the power to lead in world trade recovery.

The Pacific Area

Some Notes on the International Trade of the Pacific Ocean that Should Hearten the Pacific Coast Ship Operator

By Wallace R. Farrington*
Former Governor of Hawaii

THE Pacific Area offers us the largest potential market in the world. This fact has been repeated and demonstrated so frequently that it is almost a platitude.

To gain the results we are seeking, we must know the people of the area and foster among them higher standards of living. Citizens of the United States inherit a friendly tradition in Polynesia and the Orient going back to the days of the clipper ships and their merchant captains. We are to-day heavy buyers in the Oriental markets and enjoy the moral advantages that can be commercialized by a buyer who also has something of real value to sell.

Reciprocity is the source of prosperity.

We have the men, the money, the lines of transportation, and the lines of communication. When, with all of these, we get understanding as we should be able to do through an increasing corps of private salesmen and public representatives who are able to think in terms of the Pacific Area customer, and to translate those terms in their proper values to our own countrymen at home, we shall then dominate the market in a manner that measures up with our exceptional opportunities.

Pacific Area Trade in 1930

We say that business has fallen off in 1930, but at that our trade within the Pacific Area amounted to more than $1,328,000,000.

Reviewing the Pacific trade area of to-day, the latest figures obtainable show that in 1930 the United States sold to China, including Hong Kong and Kwantung, goods valued at $112,775,000, and bought values totalling $113,281,000.

Japan in the same period bought from us a total of $164,658,000, and our import trade from Japan came to a total of $279,113,000.

We sold to Australia a total value of $76,082,000, and bought $17,453,000 worth of goods.

To New Zealand we exported to a total value of $29,827,000, and bought goods amounting to $11,621,000.

From British Malaya our imports amounted to $144,032,000, and we sold them goods worth $9,601,000.

The Dutch East Indies were purchasers to a total of $30,398,000, and we bought from them a total of $57,890,000.

We bought from the Philippines goods valued at $109,390,000, and sold them $64,935,000.

We exported $1,055,000 worth of goods to British Oceania and bought from them up to $2,047,000. We bought from French Oceania $1,671,000, and from French Indo-China $1,549,000. Siam bought $2,365,000 of merchandise from us.

These figures make it clear to any who may be doubtful that the American business man is in the Pacific area today on a reasonably favorable basis. He is a buyer. Therefore, he is a builder of prosperity for the prospective customer-consumer. In some instances we have reciprocity that laughs at tariff walls.

Market is Varied

The market is big enough to intrigue the largest operator in money and materials. It is varied enough to offer ample scope for the buyer and seller of small necessities or of luxuries. It is complicated enough to challenge the ability of the expert adjuster. It is dangerous enough, in the sense of taking chances in new fields of endeavor, to supply a modern edition of the era of discovery and romance universally associated with the names of the European explorers and the Yankee sea traders who drove ahead over uncharted areas to barter with the natives in the terms of civilization of those days. Though the trade in the Pacific Area is now measured in billions of dollars, our business men have hardly begun to touch the edge of the rapidly developing certainties of this greatest of America's modern trading fields. In spite of the frequent reference to the period of depression, the dreams and the predictions of the trade prophets of yesterday are so rapidly coming true that we have to use new yardsticks to adequately estimate the future.

Pacific Share in World Trade

In 1913 the total world commerce was 41 billions of dollars. Six billions of this or 14 per cent. was handled by countries of the Pacific Area. In 1929, the total world commerce was 67 billions, and the Pacific Area countries did 21 per cent., or nearly 14 billion dollars.

The rate of increase in the sixteen-year period is significant. World trade increased 61 per cent. The commerce of Europe gained 36 per cent. The gains of Pacific countries range from 75 per cent. in the British East Indies to 272 per cent. in Colombia where oil development was the principal feature. Japan's gain was 211 per cent., or a total trade in 1913 of $674,000,000, advancing to $2,110,000,000, in 1929.

Measuring the trade of this sixteen-year period in terms of United States business, we find from 1913 to 1929 a gain for the United States of 125 per cent. The Atlantic districts gained 90 per cent., the Gulf

*Abstract of an address delivered at the Eighteenth National Foreign Trade Convention at New York, May 27, 1931.

district 120 per cent. The Pacific Coast districts showed a gain of 306 per cent., or, put in dollars, from $275,752,000 in 1913 to $1,118,558,000 in 1929. Though smaller in amount than the trade of the Atlantic districts, the Pacific Coast portion of the total United States trade rose from 6½ per cent. to 11½ per cent. and the Atlantic Coast proportion dropped from 65.3 per cent. to 51.4 per cent.

At Honolulu, the crossroads, you get a fair picture of what is to be in the whole Pacific area. What has been done there in a small or laboratory way is being and will be repeated and expanded in other parts of the Pacific, if people of the present day have an average amount of good sense. We believe in the mission and the future of the Pacific. We believe those on this side of the Continent should share in the adventure of the American trade. Nowhere can the trends be observed and visualized to better advantage and profit than from this meeting ground of friendliness. In Hawaii as one unit of the Pacific area all peoples have found a fair haven since the explorers and traders first ventured on the new route to the wealth of the Indies. Right now most everyone is busy telling the world what cannot be done. We do not need to attend a meeting of the International Chamber of Commerce to hear the doctrines of the defeatists. A good share of our own people propose in effect that we adjourn business and take to the woods, letting the government hold the bag. It is in just such situations that traders of the United States have made their mark by moving forward into action while others were talking about what might be done.

As a suggestion from the Pacific Area, I may summarize lines of action that may build business and make friends:

1. Correct the immigration law inequalities. Wipe out exclusion except as controlled by the quota.

2. Support our government in every move to strengthen, on typically American lines, the service of the State department and the foreign services of the Departments of Commerce and Agriculture.

3. Face the silver situation, and when requesting our government to use its good offices for an international conference offer a platform that will be supported. Too often the government is asked to act and then whatever the government does is wrong.

4. Foster the study of the languages of the peoples of the Pacific in our schools and colleges. We cannot fully understand a people until we speak their language.

5. Vigorously support the extension of the American merchant marine. Let the farmer know that 50 per cent. of the exports of our country are agricultural products.

6. Invest liberally with money and energy in public and private enterprises for promoting travel to and through the countries of the Pacific.

7. Make it evident to the press of the country and the news gathering associations that the news of the business of the Pacific is as interesting to a growing number of readers as the news of the bandits And under any circumstances that we support the organizations that give the facts from the American viewpoint, rather than foreign propaganda.

8. Aid the measures, public and private, for lowering the costs and increasing the volume of message transmission across the Pacific.

9. Offer a friendly interest toward conferences, such as the Institute of Pacific Relations, that bring together representative people of Pacific countries for fact finding and discussion.

10. Require that courtesy shall be the distinguishing characteristic of the agents of the government at ports where foreign visitors enter.

11. Finally, by every means of individual initiative and public policy, build up our volume of American courage and energy, balanced by self-respect and respect for others, qualities that weave the bands of good will into a fabric of ever increasing business power.

Though some of my "hard-boiled" friends may remark that this is too good to be true, I have only to say that our United States of America is what we enjoy today because of those, who, having heard of what could not be done, have straightway heeded the challenge and have gone forth to do it.

The Pacific Area beckons to pioneers and business leaders of this type.

Part of the towboat fleet of Young Brothers Limited at Honolulu.

New Type

Columbia River Motorship

First Steel-Hull, Single-Screw, Tunnel-Stern Passenger and Cargo Shallow Draft Motor Vessel for Columbia River

NOTABLE among Columbia River craft built during recent years is the motorship L. P. Hosford, recently completed by the Albina Engine & Machine Works of Portland, Oregon, and delivered, after successfully passing all trial trip tests to the Harkins Transportation Company of Portland, of which L. P. Hosford is the chief executive and manager. This vessel is the first steel hull river steamer to be built on the Columbia and the first with single-screw, tunnel-stern construction. As will be noted from the illustrations herewith, she is a neat, trim craft with a beautifully modeled stern.

The L. P. Hosford is for express passenger and freight service on the Columbia and Willamette Rivers on the 24-hour round-trip route between Portland and Astoria and way points. Because of the conditions prevailing during low water at many of the river ports, she is limited in full load draft to seven feet.

Her principal characteristics are:

Length	160'0"
Beam	30'0"
Depth of hold	10'6"
Draft, normal full load	7'0"
Normal freight capacity, tons	350
Maximum freight capacity, tons	500
Passenger capacity, persons	250

The steel hull is, of course, lighter for the same strength and gives much more clear space in the engine room and all interiors than would be the case with wooden construction.

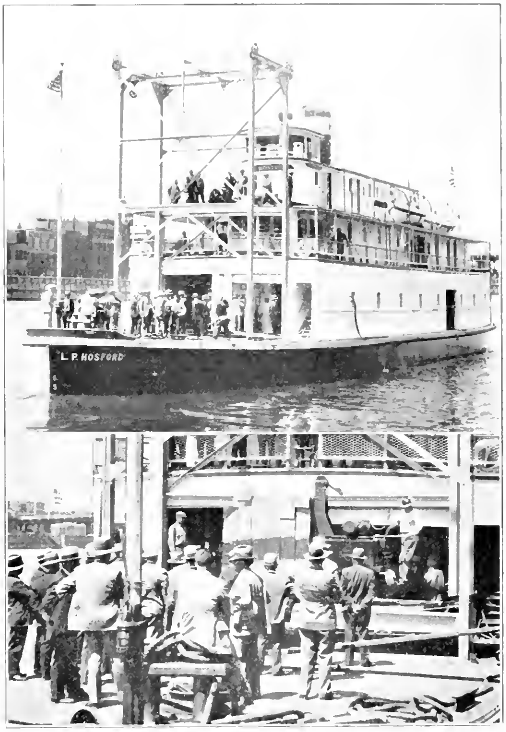
Passenger Accommodations

On the upper deck of the L. P. Hosford there are 19 staterooms with sleeping accommodations for 50 persons. A nice dining room, served by a modern electrically equipped galley, provides regular restaurant service. A large Frigidaire is installed in connection with this galley. Lounge, smoking room, and deck promenade provide ample day accommodations for the entire passenger capacity.

Officer's quarters are in staterooms aft of the pilot house on the Texas deck. Crew quarters are in the hold forward of the engine room.

Freight Handling

Practically the entire main deck is for freight. For greater facility of handling and to accommodate variations in river level, a Barlow elevator is built into the hull just forward of the superstructure. This power driven freight elevator has a platform travel of 28 feet vertically and a capacity of 5 tons. The Colby Steel & Engineering Company of Seattle builds the Barlow elevator. For handling loads of freight on and off this



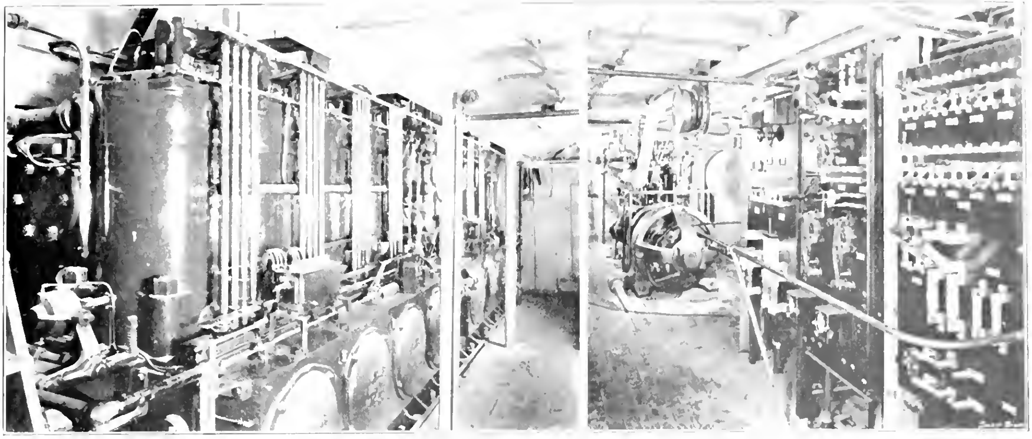
Upper: The L. P. Hosford ready to start on her trials. Lower: A close-up of the freight elevator with a loaded electric truck on the platform.

elevator, the L. P. Hosford is equipped with Elwell-Parker electric lift trucks. Ample side doors are provided for handling at main deck levels.

Machinery Plant

The L. P. Hosford is propelled by a single 3-bladed screw, 79 inches diameter and 72 inches pitch, directly driven by an 8-cylinder, 500-brake horsepower, 260-revolutions per minute, Atlas-Imperial diesel engine. This engine is of the 4-cycle, solid-injection type, directly reversible and very simple in its control, with great flexibility. On her trials the vessel easily exceeded 15 miles an hour over the measured mile.

The arrangement of propellers and rudders in the tunnel construction of the stern is clearly shown in the



Two views in the engine room of the L. P. Hosford showing 500-horsepower Atlas-Imperial diesel propulsion unit and 60-horsepower Atlas-General Electric generating set.

photograph. The outer bearing boss on the propeller shaft is carried on two well braced struts and is fitted with a Goodrich Cutless Rubber Bearing installed by the Portland branch of the B. F. Goodrich Rubber Company. Quick maneuvering in rapid currents is insured by installing a large main rudder aft of the propeller and a smaller monkey rudder forward of the wheel and above the shaft. Both of these rudders are controlled by the pneumatic steering gear.

Four large steel fuel tanks, two in the engine room and two forward, carry sufficient fuel for seven round trips.

All auxiliaries are electrically driven. Power for this purpose and for lighting the boat is provided by a 60-brake horsepower Atlas-Imperial diesel engine direct-connected to a 40-kilowatt General-Electric direct-current generator.

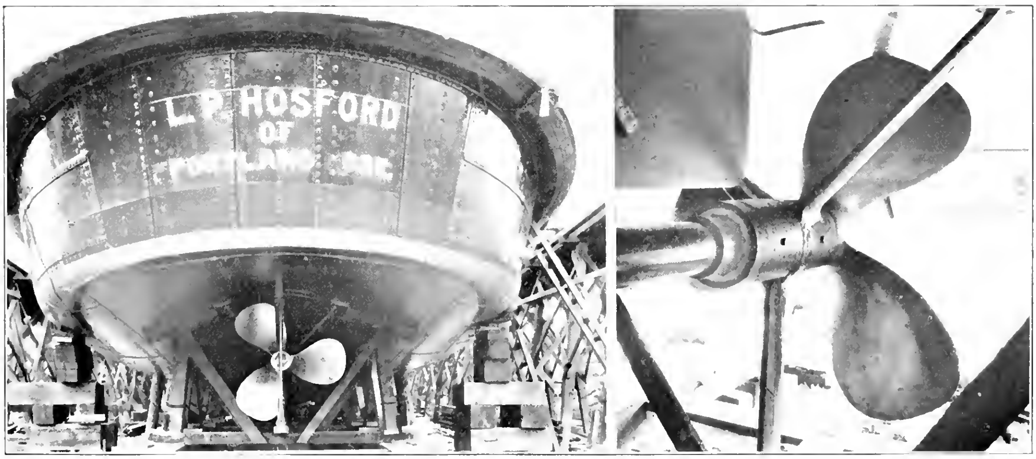
At its forward end the engine of this generating set is clutch-connected to a shaft that drives the worm gear of the winch operating the Barlow elevator. This clutch is controlled from the forward main deck at the elevator tower. Electrically driven auxiliaries include a Rix auxiliary air compressor, a Bingham fire, deck, and bilge pump, a Uniflo automatic fresh water circulating system, and a fuel transfer pump.

A Cleanwell oil filter, supplied by the Oil Filter Company of Oakland, California, protects the lubricating oil for this power plant. An American Radiator Company Ideal heating boiler supplies steam heat to the passenger and crew quarters. A Wolton charging panel is installed to take care of the storage battery requirements of the electric trucks.

The L. P. Hosford's engine room is well ventilated and provides ample space for accessibility to all parts of her main and auxiliary power plant and mechanism.

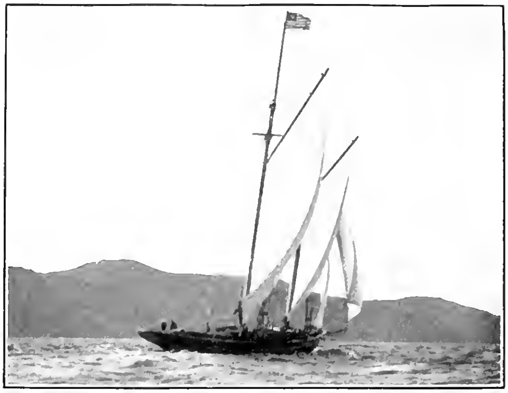
The steel hull below the main deck is divided by water-tight bulkheads into four compartments. She has a sharp, easily sloping bow for riding over river ice with the hull lines flattening aft of the first bulkhead to assume the conventional river boat sections. Extra thick plating is laid over all portions of the hull that

(Continued on last Page of Blue Section)



Two views of the stern of the L. P. Hosford on the ways in the builder's yard showing lines of tunneling and arrangement of rudders and outboard propeller shaft bearings.

Around the World With an American Diesel Power Plant



The yacht Zaca under sail.

ZACA, the crack schooner-yacht owned by Templeton Crocker of San Francisco, recently completed a 28,000-mile cruise during which she circumnavigated the globe. This yacht, built by Nunes Brothers, Sausalito, California, under the supervision of Captain Garland Rotch, is said to be the largest wooden craft of its type ever built on the Pacific Coast. She was completely described with illustrations in the June 1930 issue of Pacific Marine Review.

Zaca was designed primarily with the idea of winning the San Francisco-Tahiti ocean sailing race, and secondarily with the idea of a world cruise following the race. For the secondary purpose she was equipped with a propulsion plant consisting of two 6-cylinder, 6-inch bore and 10-inch stroke Hill diesel engine, each developing 125 horsepower at 800 revolutions per minute, and each driving a propeller shaft through a reverse gear and a hydraulic disconnecting clutch fitted with remote control. Due to the primary purpose of the design, the engine room on the Zaca was very cramped and literally filled with machinery. Auxiliary power was provided by two $2\frac{1}{2}$-kilowatt Westinghouse generating sets driven off the shafts of the main engines and by two single-cylinder, 5x7-inch, Hill diesel engines, each driving a $4\frac{1}{2}$-kilowatt Westinghouse generator and one driving, in addition, a clutch-connected Rix air compressor.

The Hill diesels were furnished by and installed under the supervision of King-Knight Company of San Francisco, Pacific Coast distributor for the Hill Diesel Engine Company.

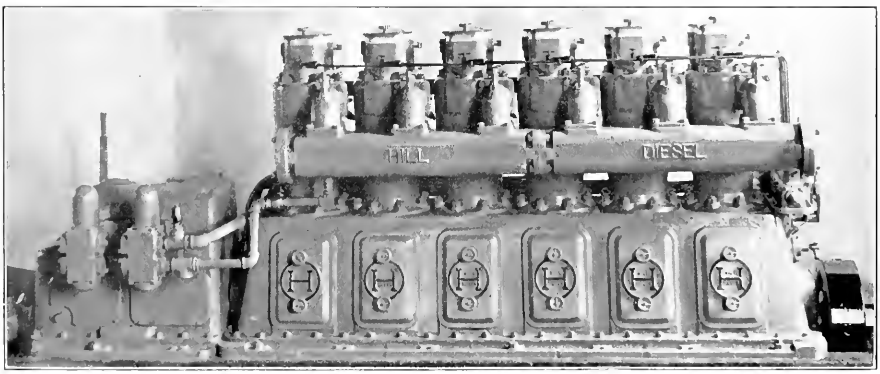
During the world-circling cruise of the Zaca, the main propulsion engines were used on 21,000 miles of cruising during 350 days. The only forced stop during that time was due to a broken oil line which was readily repaired. Considering the crowded conditions in the engine room and the lack of facilities and trained personnel on the cruise, that is, we think, a rather remarkable record.

The auxiliary engines were in operation every day of the cruise. Each engine ran 18 hours every other day, or an average of 9 hours per engine a day.

Absolutely no trouble of any kind was had with these small engines. The valves were ground and the lubricating oil changed at intervals. Otherwise no attention was necessary.

Through Oceania, the Dutch East Indies, the Philippines, the Straits Settlements, on the Pacific, the Indian Ocean, the Red Sea, the Mediterranean, the Atlantic, the Gulf, Panama, and so home again to San Francisco this dependable power plant was always on the job and met every demand made upon it. All that such a power plant asks from its attendant engineer is that an adequate supply of good lubricant shall reach all of its bearings and wearing surfaces and that the fuel supplied to its injection nozzles be reasonably clean and of suitable quality.

A Hill diesel engine has recently been purchased by the University of California because in the judgment of the engineers of the College of Agriculture it is especially adapted for demonstrating the economy that would result through the use of diesel power for farm purposes. Another recent sale made at San Francisco by King-Knight Company will introduce several Hill diesels into the electric lighting of oil fields in South Persia, almost exactly half-way round the world from the Golden Gate.



The 6-cylinder, 125-horsepower, Hill marine diesel engine. Two of this type form the power plant of the Zaca.

The coastwise express passenger cargo steamer Iroquois as she appeared on her Atlantic runs. She now wears the customary all-white dress of the LASSCO fleet.

Steamship Iroquois—Running Mate for Yale

AS a companion ship to the fleet express liner Yale in the Los Angeles Steamship Company's coastwise service between Los Angeles, San Francisco, and San Diego, Ralph J. Chandler, vice-president and general manager of LASSCO, has secured the modern passenger liner Iroquois and will have her in operation on the California coast about July 1.

Built at Newport News in 1927, the Iroquois has a length of 407 feet 3 inches over-all, 62.2 feet beam and 19 feet depth. She has a net tonnage of 3405 and a gross of 6209 tons. The liner is of twin screw propulsion with compound geared turbines. Steam is supplied by six Babcock & Wilcox water-tube boilers with topside superheaters and operating at 275 pounds working pressure. The vessel has an operating speed of close to 20 knots.

She is luxuriously appointed throughout, having operated in the service of the Clyde-Mallory Lines between East Coast ports and Havana, and boasts a wide choice of stateroom accommodations. Luxuriously fitted public rooms—including a veranda cafe ballroom, smoking room, lounge and writing room, and dining room of somewhat greater capacity than that of the Yale together with four private dining rooms—make the Iroquois an ideal ship for use on Lassco's coastwise run.

The Iroquois has a passenger capacity of 470, two passengers to a room. When necessary, settees in certain of the rooms may be employed as berths, and the maximum capacity of the liner can be raised to approximately 600. Passenger quarters are so arranged with regard to ventilation and size that this can be done when necessary without discomfort to travelers.

Most of the staterooms on C deck and many of those on D deck are furnished with beds. Suites consisting of parlor, twin-bed stateroom, and private bath; suites with twin beds and private bath; suites with twin beds and private shower; suites with double bed and private bath; rooms with private toilet and shower; rooms with private toilet; outside rooms of preferred location and size and a number of outside and inside average rooms on various decks are available on the Iroquois to conform to individual requirements.

A special feature of interest to those travelers desiring to check their automobiles like baggage is the provision of facilities for so carrying about eighty machines.

Three interiors on the steamship Iroquois. At left, dining saloon. At center, one corner of the smoking room. At right, part of lounge.

What of
Competition from the Air?

A Review of Recent Trends in Commercial Aviation and Its Relation to Expansion in Overseas Transportation

P. W. Litchfield, president, The Goodyear Tire & Rubber Company and The Goodyear-Zeppelin Corporation.

WHAT effect will transoceanic air travel have upon the future trends in ship design, ship propulsion, and shipping revenues? This question has recently been the subject of much speculation among interested groups representing shipping and aeronautic industry.

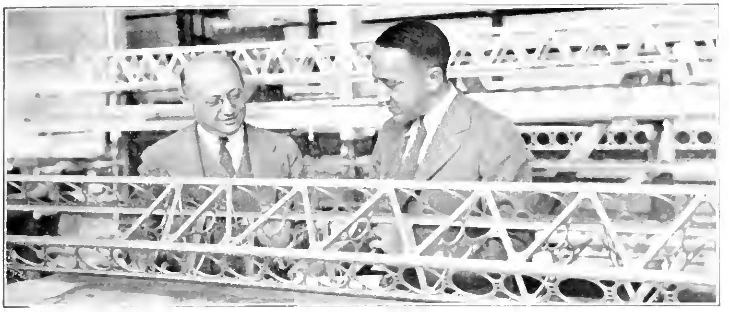
No airplane has yet crossed the Atlantic with any payload aboard. The pilots and gasoline for the long hop are just about the limit that a good, modern plane can lift. Head winds or engine trouble of any kind would be almost sure to cause a forced landing short of the goal. So, at the present state of the art, transoceanic flights by heavier-than-air machines are not a commercial proposition. There is, of course, the possibility of floating landing stages, but that also is largely a dream of the future; and the maintenance of such landing stages would add greatly to the overhead of such an enterprise. There is also the possibility that some revolutionary invention along the lines of condensed fuel, improved motive power plant, or aerodynamic structure will produce a plane better able to cope with the transoceanic flight.

On the other hand, the zeppelin, or rigid airship, has crossed both the Atlantic and the Pacific with pay load; has, in fact, circled the globe with a substantial pay load of passengers, mail, and express freight. Since this event it has been quite the fashion to compare the airship with the ocean liner.

Thus we see that the airship is reasonably safe when in the air, just as the liner is reasonably safe if she has plenty of sea room. The airship is unsafe when approaching land unless she is provided with suitable harbor or moorings, just as our great liners can safely approach land only in a few major harbors that are especially prepared for them. Airships and liners alike must be carefully supported when in dock for repairs. These facts are all stressed in a masterly paper on "Transoceanic Air Travel," read by I. C. Hunsaker, vice-president, Goodyear Zeppelin Corporation, before the 1930 National Aeronautic Meeting of The Society of Automotive Engineers of New York. He deduces from the facts that:

Airplanes will offer a frequent service analagous to railway service or to short run coastwise steamers. Airships will offer a long, nonstop, comparatively infrequent service analagous to that of ocean liners, the airplane and the airship each in its respective sphere giving "a fast de luxe service to a small percentage of the traffic moving."

The Goodyear-Zeppelin Corporation airship factory and dock at Akron, Ohio. This building has the largest uninterrupted floor space of any yet constructed—364,000 square feet, or approximately eight acres. Its length is 1175 feet between center lines of door tracks; its width is 325 feet; and its height from floor to the top is 211 feet. A similar dock is being built at Sunnyvale, California.

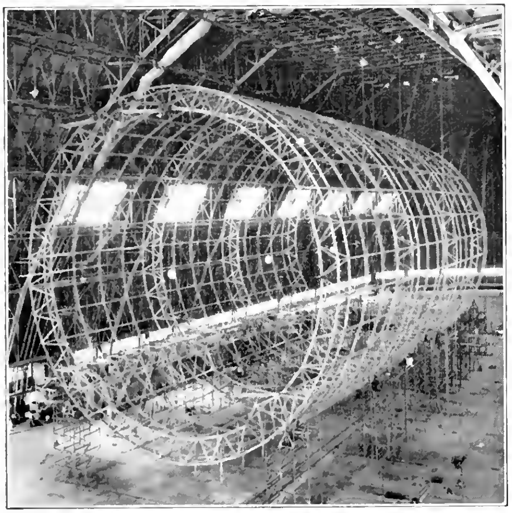


Dr. Karl Arnstein, vice-president and director of engineering for The Goodyear-Zeppelin Corporation, inspecting, with an assistant, built-up Duralumin struts for the frame for the Akron (ZRS-4). (Dr. Arnstein is at the left in the photograph).

"The commercial airship will always be a large unit costing several million dollars and carrying a pay load of many tons." That "many tons" sounds ominous to a ship owner until he gets the specifications. "Fifty to one hundred passengers and 10 to 20 tons of mail and express will be a reasonable pay load."

On land the airplane in mail and passenger service is already well established. As of July 1, 1930, there were 1655 established airports and landing fields in the United States. During the year ending on that date, 25 privately operated air mail and passenger routes flew 14,938,268 actual service miles and delivered 7,715,741 pounds of mail. The total air transport mileage flown in the United States during the calender year 1929 was well over 20,000,000.

At the Fourth National Aeronautic Meeting of the American Society of Mechanical Engineers, May 1930, Carl B. Fritsche, vice-president, Detroit Aircraft Corporation, read a paper on "Some Economic Aspects of the Rigid Airship," in which he discusses the commercial application of the airship and makes some interesting comparisons between a mythical 300-ton displacement airship and the actual liner Leviathan. Just why a comparison is made with the Leviathan and not with the Bremen or Europa, or the Empress of Britain, it is hard to see, since the airship will, of course, have every advantage of modern improvements in streamlining and in power plant engineering. However, by giving the airship all the possible "breaks," it is shown that she would require less energy to transport one ton of cargo across the Atlantic than would the Leviathan. This comparison is based largely on cost of fuel; and since the Leviathan is notoriously uneconomical, the airship shows up well.



Naval architects and marine engineers will be interested in this picture showing a portion of the parallel middle body of the airship in frame on the ways in the airship factory. The outside diameter of these frames is 132 feet. The arrangement of triangular girder rings forming transverse passageways is plainly shown; also the longitudinal heavy girders forming passageways at three points in the circumference.

However, it is predicted "that in the present generation airships will encircle the globe in regular operation, supplementing present land and water transport facilities, and that by shortening the line of communication, their use will expedite trade and thus increase the volume of commerce."

These predictions are peculiarly interesting to Pacific Coast operators because of the ZRS-4 now nearing completion at Akron (Ohio) Zeppelin Dock of the Goodyear-Zeppelin Corporation, is to be stationed on the Pacific Coast at the Zeppelin Dock to be built at Sunnyvale, California.

A Zeppelin Dock

These zeppelin docks and the rigid airships for which they supply safe haven are very interesting structures. The airship factory and dock at Akron, the latter forming the model for the dock to be built at Sunnyvale, California, is of semiparaboloid cross section, and its longitudinal section is formed of two semiparaboloids with a straight line connecting their upper ends. In general the structural design consists of eleven paraboloid arches, spaced 80 feet on centers and connected by a system of vertical and horizontal trusses. At each end of this main shell are two diagonal arches meeting the end arches at the pins. The open ends of the shell thus formed are closed by huge doors built in the same manner as the shell. Each leaf of these doors form one quarter of a hemisphere and is 202 feet high and 214 feet wide at the base. The upper tip of each leaf is supported horizontally by a ball-and-socket-joint type thrust bearing working on a 17-inch diameter steel pin. The entire weight of the leaf, which is 600 tons (without considering wind pressure or possible weight of snow), is carried on 40 forged-steel, double-flanged wheels, 27 inches in diameter, installed in pairs and set radially so as not to bind on the circular track.

The Akron (ZRS-4) reproduced as she will appear when finished and superimposed to an equivalent scale on an aerial photograph of the capitol at Washington. The position of the four starboard propellers is plainly indicated.

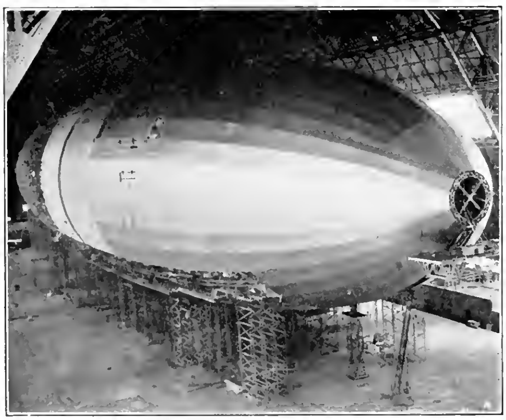
Her over-all length of 785 feet, with a maximum beam of 132.9 feet, would give her approximately the same volumetric displacement as the world's largest ocean liners; and her total useful lift will be 91 tons.

Each wheel is separately mounted under spring loaded bearing boxes so that the load will be evenly distributed. Each half is opened or closed by a rack drive operated by a 125-horsepower motor.

This building is the largest structure in the world, without interior supports. It is 1175 feet long between centers of door tracks, 325 feet wide, and 211 feet high from platform floor to top of roof. Its interior floor area is 364,000 square feet and it has a cubical content of 45,000,000 cubic feet, said to be ample to house the United States airplane carriers Lexington and Saratoga, with a scout cruiser or two thrown in for good measure. In the shell and door framing 7200 tons of structural steel were used.

World's Largest Airship

The ZRS-4, now nearing completion in this dock at Akron, wll be the largest airship of its type. The table herewith gives a comparative idea of her dimensions.



A recent photograph of the Akron (ZRS-4) in the ship factory showing progress in securing the skin covering over the framework. This ship will soon be ready for her initial tests and for her voyage out to her home port at Sunnyvale, California. After the skin has been completely applied, the gas bags will be placed in the interior and partially inflated to float the ship off of her ways.

Principal Characteristics of the Los Angeles, The Graf Zeppelin and The ZRS-4

Name	Los Angeles	Graf-Zeppelin	ZRS-4
Nominal Gas Volume, Cu. Ft.	2,470,000	3,700,000	6,500,000
Length Overall, Ft.	658.3	776	785
Maximum Diameter, Ft.	90.7	100	132.9
Height Overall, Ft.	104.4	113	146.5
Gross Lift, Lbs.	153,000	258,000	403,000
Useful Lift, Lbs.	60,000		182,000
Number of Engines	5	5	8
Total Horsepower	2,000	2,750	4,480
Maximum Speed, Miles Per Hour	73.1	80	83.8
Range Without Refuelling at 50 Knots Cruising Speed, Land Miles	4,000	6,125	10,580

The hulls of this vessel is built on "triple-layer principle."

1. A rigid metal framework to withstand major stresses;

2. Gas cells within to retain lifting gas;

3. An outer cover of taut fabric to retain smooth streamline and protect the frame and the gas cells from weather.

The Duralumin framework is composed of transverse rings or frames joined and braced by longitudinal girders. In the main body of the ship the frames or rings are 36-sided polygons. In the tail the number of faces in these polygons is reduced to 24. There are two types of transverse frame; namely, main and intermediate.

The main frames take all the major stresses. They are spaced about 74 feet apart and are built up with a single inner ring and the two outer rings connected by cross-girders, giving a stiff triangular section to the frame. The space inside this triangle section forms a foot walk clear around the ship at every main frame, giving access for inspection and making easy cross passages between the longitudinal galleries. The intermediate frames, of which there are three between each pair of main frames, are formed of inner and outer annular rings joined by lattice girders. The chief function of the intermediate frames is to stiffen the longitudinal girders. All of these ring frames are joined together by longitudinal girders at each of the 37 corners. Three of the longitudinal girders are triangular in section like the main frames. These three are located at the top center and at 45 degrees each side of the bottom center and form longitudinal galleries for the major part of the length of the ship. The ring frames and their longitudinal girders form a series of flat panels and they are thoroughly braced by steel piano wire stretched diagonally across these panels.

There are 12 gas cells in the ZRS-4. These occupy mainly the space between the main frames. A system of wires and cord nettings transfers the gas pressure to the metal framework. It is interesting to note how this bag structure conforms to the water-tight bulkhead idea of safety on seagoing vessels. The ZRS-4 is so designed that with complete loss of buoyancy in two compartments the ship will float safely in the air. Over-pressure gas valves, which open automatically under pressure to release any surplus, protect these gas bags against expansion. One valve in each bag is mechanically operated from the control car.

This control car is located forward and is built as an integral part of the structure. This room will house all of the latest devices for efficient navigation and control. The radio cabin and commanding officers' quarters are located in the hull directly over the control car. Near the middle of the ship and along each side gallery are located rooms for officers and crew, ample cooking facilities, mess rooms, and complete and comfortable living compartments.

Power Plant

ZRS-4 will be powered with eight engines with a total capacity of 4480 shaft horsepower, each of these engines driving a propeller. Each engine is installed in a separate engine room built within the ship's structure. Only the propeller shaft housings and their bracings extend beyond the streamline of the hull. This arrangement is made possible by the use of noninflammable helium gas as the lifting medium and should show great gain in propulsive efficiency as compared with the old arrangement of housing the power plants in gondolas or cars outside the main structure. It is calculated that the eight propellers at full speed will drive the ZRS-4 a 83.8 miles an hour in still air.

The engines are directly reversible so that the propellers can be used either for fore or aft thrust. The propellers are driven through bevel gears and are arranged so that they can be tilted through 90 degrees and used either to accelerate lift or to retard drop; a very valuable feature in maneuvering.

Another interesting and unique feature of these power units is the condensation of water vapor from the exhaust. When fuel is used on an airship there is a constant definite loss of weight for which compensation must be provided. Helium gas is too valuable to be released in order to balance this loss of weight, so the United States Navy experts worked out a condensing system for the exhaust from airship engines that gives more than enough water ballast to compensate for the loss of weight through use of fuel.

Airplane Compartment

In the ZRS-4 about one-third of the ship's length from the bow, is arranged a compartment 75 feet long by 60 feet wide fitted for the storage of five completely assembled airplanes. Collapsible doors in the bottom of the ship cover a Tee-shaped opening through which an airplane attached to a launching trapese may be lowered or raised.

Passenger Possibilities

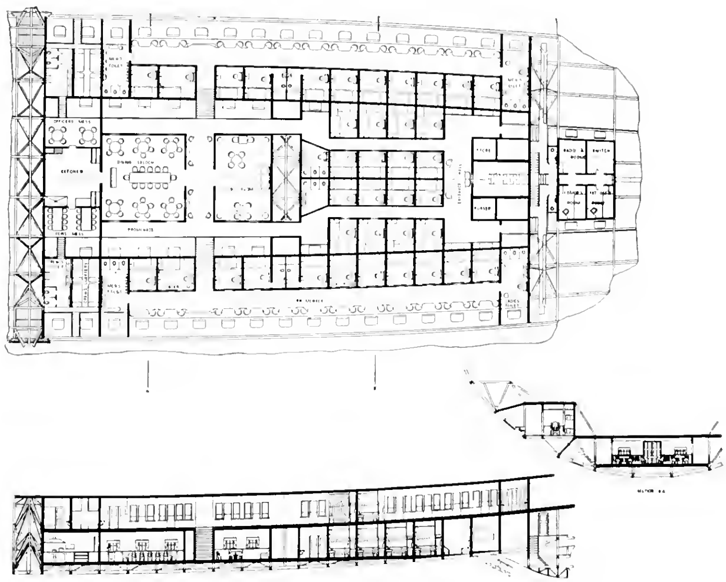
A lay-out is shown herewith for comfortable quarters to take care of 75 passengers on a transoceanic flight. Another layout for 100 passengers that could easily be accommodated in the hull of the ZRS-4 shows 12,000 square feet of deck area.

The contribution of the airship to transportation will be supplementary rather than competitive. It will cater to that part of passenger and merchandise transport which demands higher speed with safety and is able to meet the price. There is no indication in the present status or trend of airship or airplane development that any considerable proportion of the world's regular transportation business will fly or float through the atmosphere.

All history has shown that greater speed of transport means greater volume to be transported. Sea surface lines and overseas air lines will alike be beneficiaries as this new vehicle takes its place in the field of transoceanic international transport. Better communication means better understanding and breeds mutual confidence leading to greater trade.

PASSENGER QUARTERS LAYOUT ON LARGE AIRSHIP

This general arrangement plan and inboard profiles show how first-class accommodations for 75 passengers would be installed on a passenger airship of the same size as the ZRS-4. It will be noted that each room is for two passengers, that there is a club, or smoking room, and a large dining saloon, and a view promenade. Ship operators will note that the airship idea for public rooms and public promenade space is approximately twenty-five years behind that of the first-class ocean passenger liner.



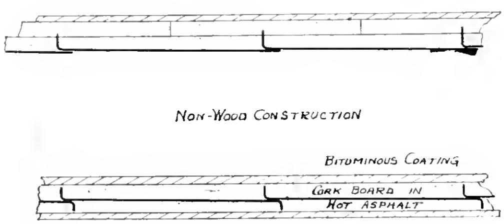
Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part VIII.—Construction of Cold Storage Chambers

By L. L. Westling

THERE are nearly as many types of "reefer" construction as there are men who design them. There are, however certain fundamental facts that make certain methods and certain materials most acceptable. Every manufacturer of insulating material has reasons to believe his product is most suitable, and the operators, basing their knowledge upon experience, will have decided opinions on the subject. Aboard ship conditions are very different from those ashore, and construction peculiar to these conditions has been developed. The first requirement is to obtain the most efficient, lasting construction for the least cost. Great care to produce an efficient plant at the machinery end can be largely cancelled in poorly insulated spaces. The production of the "cold" is only half the story; it must be effectively conserved.



Two suggested bulkhead constructions eliminating the use of wood.

A previous chapter has dealt with the subject of heat transmission and need not be repeated here. Every material has its own conductivity value and obviously one of low conductivity or high insulating value will conserve the "cold" or retard the heat flow into the spaces. The accompanying table shows the relative insulating values of various insulators.

Many contractors arbitrarily take the value of 4 B.T.U. per square foot of surface for calculation of refrigerating loads and heat leakage.

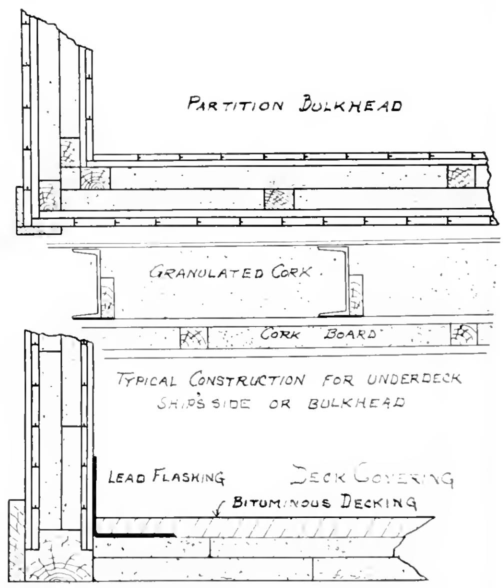
Insulator Requirements

A good insulator for ship use shoud be:—

1. Of low conductivity.
2. Resistant to deterioration or decay.
3. Resistant to absorption of moisture.
4. Resistant to absorption of odors.
5. Light in weight.
6. Easy of handling in construction.
7. Of reasonable cost.
8. Suitable to ship board conditions—i.e., unaffected by intermittent refrigeration, movement of construction in sea strain, or vibration.
9. Resistance to mechanical damage inloading and unloading or carrying cargo.
10. Vermin proof.

(1) Low conductivity allows efficient insulation and a minimum loss of space to revenue purposes. It reduces the heat leakage which the machinery must absorb, and it will prevent rapid temperature rise in case of shut-down.

(2) and (3) Widely varying conditions found in ship service require a very resistant material. Chambers used as a freezer one voyage, without refrigeration the next voyage, and possibly as chill or cooler the next are subject to alternate drying and dampness. Unless provisions are properly made against moisture, rotting and deterioration are sure to result. A water-soaked insulation has little more value as an insulator



Typical insulation construction for cold storage space aboard ship.

than water itself.

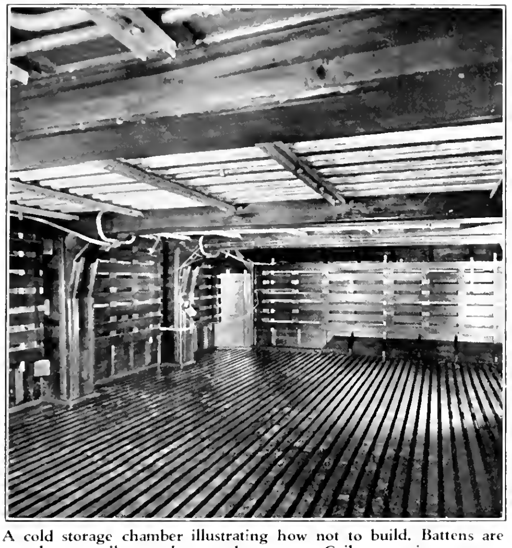
(4) Odors left in or developed by the insulation will taint certain commodities, and should be avoided. For example, chambers carrying fish one voyage and eggs another should have insulation impervious to odors to prevent tainting the eggs.

(5) Like all ship construction, the insulation should be as light in weight as possible without sacrificing strength. Unnecessary weight deducts from the ship's cargo carrying capacity.

(6) The cost of construction and of repairs or alteration demands an insulation that is easily handled and placed.

(7) Marine transportation business being conducted for purposes of profit to the owners, the cost of insulation should be as low as good practice will permit.

(8) Intermittent refrigeration produces a "breathing" of the insulation with successive deposits of moisture, and also causes successive expansion and contraction which will open seams and permit the ingress of moisture and air. This, with the movement of the ship's structure in a seaway, requires a certain amount of flexibility. Vibration may cause the settling, packing, or pulverizing of certain types of material with the resulting loss of insulation in walls or ceilings.



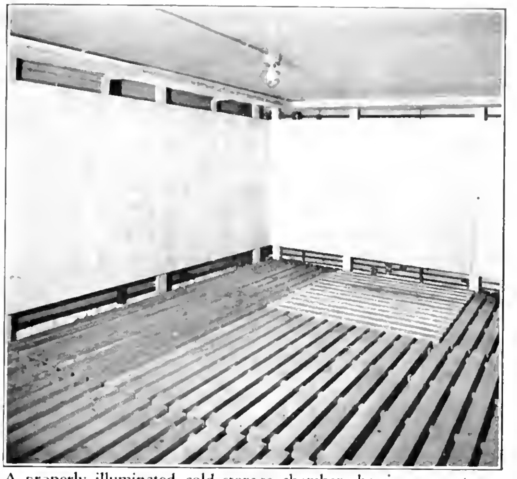
A cold storage chamber illustrating how not to build. Battens are too close to coils, too short, and too open. Coil connections are unprotected. And there are many other objectionable features, such as ceiling coils, deep beams interrupting air circulation, absence of lighting fixtures, and poor location of thermometer.

(9) The frequent handling of cargo in and out of the spaces subjects the insulation to severe strains. The insulating material should be well protected from damage by case goods, trucks, and improperly stowed cargo. Shifting cargo in a seaway requires great strength of partitions and walls to prevent damage.

(10) Vermin are a great problem aboard ship. No air or open spaces should be allowed in the insulation, for filled and sealed spaces will not harbor vermin. Open spaces protect vermin during fumigation and provide an effective brooding ground.

Some Construction Rules

All steel work should be galvanized, all deck bolts should be grommeted. All hidden steel structure should be thoroughly cleaned from mill scale, rust, or paint and treated with coating of bituminous solution and bituminous enamel. For ordinary service, 18 degrees Fahrenheit and above, 4 inches of cork board or equal is sufficient, except in way of boilers, boiler casings, etc., where at least six inches should be used. For rooms carrying below 18 degrees Fahrenheit 6 inches of cork board should be installed. All hidden woodwork should be waterproofed after being cut and a minimum amount of wood should be used, as wood has the shortest life of the materials used. A suggestion for an all steel and cork board construction is illustrated.



A properly illuminated cold storage chamber showing correct construction. Closed portable baffles, with proper clearance. No ceiling coils. Portable gratings with bearers at right angles to wall coils. And forces air circulation.

Decks and all wall flashings should be made watertight to prevent admittance of moisture and should be elastic under low temperature, and the flooring should never contain wood of any description.

All interior surfaces should be sealed from moisture by flexible coatings, or, if of wood, with not less than two coats of shellac when new, and have not less than one coat each year in service. The practice of lining the interior of refrigerated spaces with galvanized sheeting is valueless. It always rusts away and prevents drying out of insulation, with consequent rotting. Being concealed, deterioration is not discovered until serious.

Gratings. Floors should have gratings of great strength and in sections of sufficient size to permit easy removal for cleaning the chamber. The gratings should be about one-third opening and two-thirds slat. The bearers, to which the slats are secured, should not be less than $1\frac{1}{2}$ inches deep—preferably deeper—and should always be laid at right angles to the cold walls to insure rapid movement of air from the base of the coils.

Coil Battens. The cargo should be prevented from touching the coils. Freezer rooms exclusively may have open battens or wire mesh shields, but it is not good practice to use open battens in chill or cooler spaces. In these rooms the coils should be enclosed by an ef-

(Please turn to Page 290)

Mackay Radio—International

FOR many years the Mackay Radio and Telegraph Company has been an important factor in marine communications service. When it became affiliated with the International Telephone and Telegraph Corporation in 1927 it automatically became the radio communications unit of the International System; and the International System is world-wide in scope. Mackay Radio's position in the marine communications field increased manifold at the moment of affiliation.

In the past three years an aggressive campaign of expansion has added many stations to this radio network and extended its scope to new regions and new lands. Simultaneously technical research has greatly improved Mackay equipment for installation aboard ship and in all has enabled its engineering staff to have much to do with the development of ship-to-shore radiotelegraph service and equipment.

Mackay Radio operated as the Federal Radio and Telegraph Company on the Pacific Coast from 1910 until just prior to its affiliation in the International System. In this span it developed a high-speed communications service between most of the larger centers on the Pacific Coast and with ships on the Pacific Ocean.

As the Radio Communications Unit of the International System Mackay Radio took over in 1929 the famous Sayville, Long Island, radio station KYW. The station at Sayville is well known for its World War feats of maintaining communication with the German Empire when all other agencies were rendered impotent. It is one of the most powerful broadcasting plants in existence. Its associated receiving station at Southampton, Long Island, has picked up signals and messages many of which have been considered records.

With this great transmitting and receiving combination Mackay Radio inaugurated ship-to-shore radio-telegraph service on the Atlantic Ocean. Since then, the Sayville and Southampton stations have been supplemented for the Atlantic Ocean ship-to-shore service with thoroughly up-to-date plants at Rockland, Maine, and West Palm Beach, Florida. This battery of powerful units covers all Atlantic Ocean ship lanes with ship-to-shore facilities adequate in any exigency.

A station in New York City is concentrated upon service to ships in the harbor or near the shores of America's greatest seaport.

The Mackay Radio facilities on the Pacific Coast included powerful marine radio stations at San Francisco, Los Angeles, and Portland, and these stations provide ships on the Pacific with radiotelegraph service with land as inclusive in scope as do the stations on the Atlantic Coast. This high speed service between the principal cities of the Pacific Coast is maintained and has been improved.

With the development of the Mackay Radio system in the East, it was inevitable that the powerful hook-ups on the two coasts should be linked. The circuit doing this was inaugurated for commercial messages in 1929 and was engineered and is maintained to give transcontinental record communications service of the swiftest and most dependable order. In itself this Mackay Radio system provides both reach and flexibility, constituting a service of the utmost value to the American people and to all marine interests. As a coordinated unit in the International System it has become a vital part of the most comprehensive and flexible American-owned communications system.

For the ship-to-shore services on both coasts the Postal Telegraph provides thousands of pick-up and delivery offices, and 70,000 points reached in the United States. By arrangement with the Canadian Pacific Railway Telegraphs inlet and outlet is assured between ships at sea on the two oceans and all points of consequence in a large part of the North American continent. All American Cables provides the high-speed link with most Central American and South American points. Commercial Cables covers the continent of Europe and Commercial Pacific Cables operates the only cable between North America and the Orient. These coordinated with the Mackay Radio system as described comprise the International System. Traffic agreements enable this system to deliver record communications with reasonable speed to any point in the world and confine the responsibility of handling the message to a ship-at-sea or to any other point in one management, that of the International System.

In addition to their marine responsibilities, the Mackay Radio facilities have been employed to supplement the International System's service to various remote points and in several of the following cases to provide direct radiotelegraph circuits rendering the service even swifter.

Direct service "via Mackay Radio" is in operation from San Francisco to Honolulu and Manila, and the Sayville station makes possible reliable direct circuits between New York and Buenos Aires, Lima, Camaguey, a strategically situated point in the interior of Cuba, and other points. The most recent inauguration was that of the only direct radiotelegraph circuit between the United States and Vienna, Austria.

The combined engineering talents of Mackay Radio engineers with years of experience in the field and those of the International Telephone & Telegraph Corporation working in some of the finest electrical communications laboratories have produced improved shipboard transmitting and receiving units which have been installed by several of the large lines. The results have inspired the enthusiasm of their engineers and executives.

This new equipment is considered by many to be an advance in economy as well as efficiency and proficiency of performance. Instead of requiring a separate transmitter for short and for long wave operation, this equipment operates on one panel, one vacuum tube, and one set of power machinery for both long and short wave communication. From the standpoint of compactness as well as economy and facility and versatility of operation, this is hailed by marine engineers as an outstanding contribution to marine communication.

Seldom has any service so vital to marine interests developed so rapidly in such a brief span. People engaged in maritime affairs are now aware that the slogan "via Mackay Radio" means the world-wide scope of the International System.

Preventing Accidents in the Shipping Industry

By Robert F. Hand

Vice President and Assistant General Manager, Standard Shipping Company

Robert F. Hand.

THERE is still much to be done in the way of reducing the number of accidents among marine workers generally, and particularly the seagoing personnel. While all shipowners have a natural desire to eliminate accidents and appreciate the need of providing a safe working place for their seagoing employees to safeguard them from injuries which are painful to the disabled ones—and costly to them, too, as well as to their employers—many of the latter have not yet realized the significant part which the institution of a safety campaign plays in the cause of preventing accidents, with its concurrent minimization of pain and suffering, expense and trouble.

There has been a tendency on the part of many to give but little credit to the safety motive, their stand being that this is a detail of operation which can be left to some minor employee, or which may be combined with some other branch of the work. Their maximum effort, therefore, consists of tacking up a few safety bulletins or postors on board their ships. Other shipowners have felt that they are doing all that is necessary to guard themselves against loss when they have taken out insurance as a precaution against claims for personal injury or accidental death among members of their crews. They fail to realize that there exists a definite relation between the premiums paid for this insurance and the losses collected from the insurance carrier. It is inconceivable that employers who are backward in their accident prevention work do not appreciate the fact that a reduction in the frequency and severity rates for their personnel accidents is bound eventually to result in lower insurance costs.

This article will not go into a lengthy discourse on the "whys and wherefores;" suffice it is to state that if those shipping men to whom the writer alludes will only sit down and figure out the expenses incurred in connection with injuries among their seagoing personnel, they will be astounded when they learn the amount which must be added to their premiums because of items uncollectible under their insurance policy. Reference is made to the deductible franchises, as well as to expenditures in numerous small cases experienced by all owners, the amounts of which fall below the franchise limit and must likewise be borne by the insured. Add also the wages that must be paid to incapacitated seamen during the unexpired period of their shipping agreements. Think of the value of the time lost by a vessel diverted from its course in order to land a seaman in need of medical treatment and hospitalization!

To all shipowners who have never made a comprehensive study of the indirect costs of the lost-time as well as non-lost-time accidents among their seagoing employees, I suggest that they initiate such a study immediately, guiding themselves by the suggestions aforementioned, and I venture to state that they will be surprised at the amount of money they are spending annually and for which no reimbursement is received from their insurance underwriters. With these figures before them, it is a foregone conclusion that they will realize the need of executing a quick reversal in their policy of passiveness respecting the cause of accident prevention.

Then there is the other type of shipowner who has been engaged for some time in the business of instilling safety consciousness in the minds of his seamen and who has been expending no inconsiderable amount of money to minimize the number of accidents. Notwithstanding his efforts, there are times when the number of casualties shows a definite upward trend, and a feeling of disappointment comes over the owner. The writer can sympathize with this type. Yet the good work must proceed; it is no different than any other venture. Even in life itself we all know there are occasions when the sun shines and occasions when it rains. The employer who is undertaking to cut down his accidents will not allow himself to become discouraged. He will exert every means at his disposal to determine the cause of the increase, make it as short-lived as possible, and carry on his efforts with renewed vigor.

It has been found that in order to obtain real, substantial results for long periods one must instill in the minds of the entire operating staff the thought that this work is indispensable. Masters and other officers must be made to realize that it is a reflection on their vessels as well as on them personally if the frequency rate is not reduced; and that it is imperative to warn or dispense with the services of every employee who is inattentive to his duties or the safety rules and therefore responsible for an accident befalling either himself or one of his shipmates.

The crux of the whole situation is the absolute necessity for shipowners and their operating managers to take a personal interest in the universal efforts being made to eliminate personnel accidents and apply the sound truths on shipboard.

Safety posters, pre-employment physical examinations, adequate medicine chests, prompt and efficient first-aid, detailed investigations of accidents, determination of causes, fixing of responsibility, and compiling of accident statistics—all have their place and are essential in connection with the campaign to improve the frequency and severity rates. The conclusion is being reached by an ever-growing number of executives or organizations employing thousands of workers that if lasting and positive results are to be attained, these self-same executives must allow no laxity to prevail and must themselves take an uninterrupted, active interest, seeing to it that every member of the managerial saff cooperates wholeheartedly. Shipping companies are no exception.

Training Burmese Boat Builders

Some Experiences of a Staff Engineer with Asiatic Skilled Labor

By T. D. Andrews

MANY and manifold are the duties of an outside manager in an American or British dockyard, and his life is generally a series of vexing problems even when surrounded by the most skilled labor and working with the most up-to-date machinery and most approved methods. Consider, then, the lot of such a manager when he has to contend with customs, the lack of training, and the peculiar philosophies of the illiterate workmen of Asia of many different tribes and nationalities.

The writer for many years was outside manager in a large dockyard in British India, manned by some 800 Asiatics, largely Hindus, but with a fair sprinkling of Chinese and Burmese. These natives were supervised by four British staff engineers. This dockyard was maintained to take care of routine repairs, overhaul, and replacements for a fleet of 400 river craft consisting of 150 steamers and 250 motor vessels. The majority of these vessels had been built in the dockyard. The outside manager in this case had not only the charge of keeping the work of the dockyard going, but he had to be a sort of domestic magistrate, almost a father and mother combined, to the 800 workmen and was continually being called in to settle their family disputes.

Hindus (or Indians) were represented among all the skilled trades. These men worked under a native foreman called "Maistry." Each "skilled" tradesman had his coolie helper, the tradesman's wages being about double those of the coolie. The coolie of to-day became the "skilled" tradesman of to-morrow, not by training but by bribing the "Maistry." He would then draw "skilled" wages until he was spotted making a bash of a job by the white staff-engineer, then he would be discharged. The "Maistry" told to get a better man would do so, collecting another bribe in the process. This seems to be an accepted custom among Indian workmen and many of the "maistries" get comparatively rich off the system.

A maistry in charge of, say, 200 coolies getting 35 cents a day will collect 35 cents a month from each coolie, in addition to the initiation fee for getting into the gang. This graft may seem petty to American standards of racketeering, but 35 cents is more than the average daily wage for coolies in India. On that wage, working over a period of three years, a coolie will save enough to take a four months vacation for himself and family at his home town, perhaps 1000 miles from the dockyard.

Touching on the ability of the Indian workman as a useful unit in the dockyard personnel, some of them are good workmen and do a little thinking for themselves, but generally speaking they are poor. Even at repetition work they make the same mistakes time after time. For instance, take the assembling of a small centrifugal circulating pump. Nine times out of ten they will put the impeller in the wrong way (when possible) and not know why they cannot get any discharge, although they had probably made the same mistake the day before and been shown where they had made the mistake. On the other hand, some of them show marked ability in dealing with a breakdown. I remember one particular case in which I am of the opinion that the average skilled engineer would have been stuck. This incident happened in a motor boat that was on a hundred-mile trip down the river. When about half way down, the white metal in one of the crank pin bearings ran out through lack of lubricating oil. Now it seems to me that many an engineer would immediately have stopped when this happened and waited until a spare part had been obtained or the old parts remetalled. The Indian operator was more original and improvised a method by which he made it possible for the trip to be completed. He took a piece of leather, a little bit thicker than the metal that had been in the bearing, cut pieces off it and fitted them into the top and bottom (after cleaning out the old metal) and was on his way in an hour's time. When I saw the crankpin after this run it was unscratched.

Another bright specimen of an operator that it was my misfortune to come across was one who was so clever that he kept his engine operating until it was almost ruined. This engine was a 6-cylinder job—cylinders being cast in single units. His water circulating pump started giving trouble and before he discovered the source of the trouble he had cracked a cylinder head which started to leak water into the combustion chamber—killing the cylinder. When he made this discovery he stationed his oilman at the seacock, instructing him to shut off the water supply until the heat of the explosions in the good cylinder (now without water circulation) had dried out all the water the faulty cylinder and almost closing the crack in the cylinder head. In this way he soon got the faulty cylinder firing, ordered the seacock to be opened, and the water circulating again around the now almost red hot cylinders. Needless to say, with this intermittent deluge of cold river water on top of the hot cylinder heads, all of the clyinder heads were soon cracked and had to be scrapped. It was only after all the damage had been done that he reported to the dockyard, expecting to be praised for the way in which he had kept the engine running. Incidents like these were almost a daily occurrence.

With regard to the Burmese and Chinese, the former race are mentally brighter than the Indian and are as a race more mechanically minded. The trouble with them is that they will not work and cannot be depended upon. The Chinese are totally different to either the Indian or the Burman and as carpenters and workers compare favorably with any white race; that is, the Chinaman I met in India—I have had no experience of him in his own country.

With all the faults of the illiterate Indian there is something in him that appeals to a white man. If they take a liking to a white man they will follow him any where. While I was preparing to leave India I was inundated with petitions asking me to take the petitioner with me wherever I was going. Some of these letters were pathetically funny. Below is a copy of one—verbatim:

Respected Sir—

I most humble & respectfully beg to bring to your kind notice.

That I am served under your honours controll as a motor apprendick* since 2 years and 11 monts without any mistak up to now in my work.

That I herd that your honour was going somewhere from dockyard, the god knows and I am very sorry about it and if your honour leave from dockyard no any budy care and help me in department and I am unwilling to work in the former place in other hands so I am willing to follow with your honour if go anywhere if not and I am will die.

I therefore request to your honour kindly call me with your honour if go anywhere or grant me a good certificate and I request your Poto.**

For which act of kindness and shall ever pray for your honours long life

I beg to remain
Respected Sir
Your most obedient servant
Syad Ahmed.

*Apprentice.
**Photograph.

European Experiments with Stabilizers

Some Interesting Nineteenth Century Efforts to Overcome Rolling and Pitching

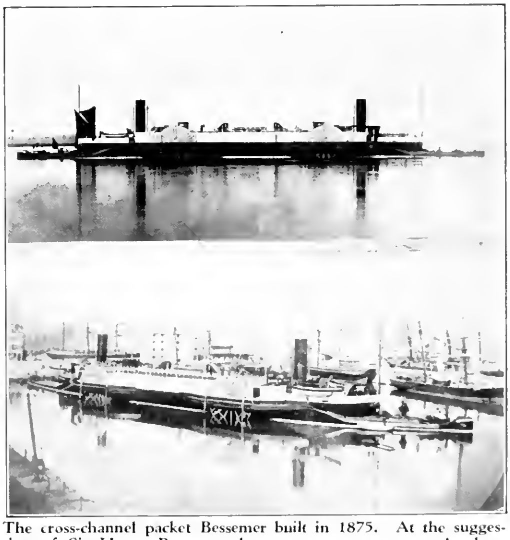
By R. C. W. Courtney

THE recent announcement that the new Italian 27-knot liner, Conte di Savoia, building by the Cantieri Reunici del Adriatico, for the transatlantic service of the Lloyd Sabaudo is to be equipped with Sperry gyro-stabilizers is of very great importance, as, if expectations are realized in service, a considerable step forward will have been made with the development of the nonrolling ship, an ideal which has been sought for many years. In the past, various anti-rolling devices have been tried with varying degrees of success, and the following brief description of a few of the examples which have appeared in European waters during the last sixty years gives an indication of the thought and expenditure already devoted to this serious problem of naval architecture.

The 21-mile passage across the English Channel from Calais to Dover, apart from being the principal line of communication between Great Britain and the Continent has a world-wide reputation for sea sickness; so it is not unnatural that attention was given to providing a remedy as soon as regular services of packet ships had been firmly established. Amongst the advocates of comfortable travel in all weathers was Sir Henry Bessemer, better known for his discoveries in connection with the manufacture of iron and steel. He had devoted a great deal of time to the possibilities of suspending cabins and saloons on gymbals on similar lines to compasses and lamps, the idea being that they would remain stationary no matter how badly the ship behaved; and a vessel was accordingly built to his suggestions in which the entire saloon was suspended in this manner.

The Bessemer, as the craft was known, appeared in 1875, having been designed by Sir Edward Reed, formerly chief constructor of the British Navy. She certainly embodied several novel features, having very low freeboard forward and aft with two separate sets of machinery, including four paddle wheels, at the extreme ends to allow adequate room for the saloon. In practice, however, it was found that the ship rolled one way and the saloon the other the resultant motion and effects on the passengers being indescribable, so that she was quickly withdrawn.

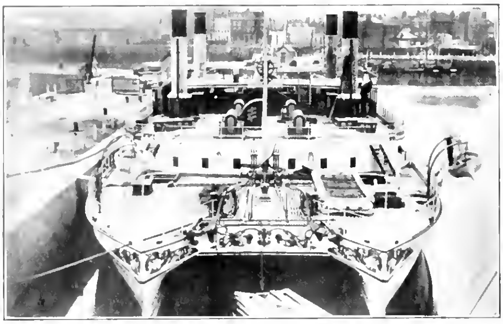
In 1877 another unorthodox craft appeared in the same service which was built with double hulls, the



The cross-channel packet Bessemer built in 1875. At the suggestion of Sir Henry Bessemer, her passenger quarters and saloon amidships were suspended on gymbals. In the choppy seas of the English Channel the saloon swung one way and the vessel another, and the passengers in all directions.

prime mover in this case being a Captain Dicey, who is stated to have been inspired by the native catamaran. This vessel, the Castalia, was constructed by the Thames Ironworks and certainly came up to expectations as to steadiness in a seaway but unfortunately was far too slow for commercial purposes and soon disappeared from active service, ending her days as a floating isolation hospital.

Contemporary with the construction of these craft, work had been commenced at Portsmouth on the British turret ironclad Inflexible, one of the most notable warships ever built, which took seven years for completion and was filled with innumerable patents and "last words" relating to naval equipment. The ship had dimensions of 320 feet between perpendiculars by 75 feet beam by 26 feet, 4 inches draft, with a displacement of 11,880 tons and a designed speed of 13½ knots on 8000 indicated horsepower. With her great beam and draft in proportion to length, coupled to the fact that the armor belt for 110 feet at the waterline was no less than 24 inches thick, it was realized the



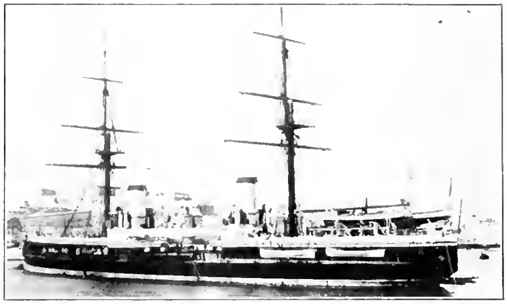
The catamaran steamer Castalia in the dock at Dover. This vessel came up to specifications for steadiness but was too slow for commercial use and was soon made into a floating hospital.

ship would have an inclination to excessive rolling on account of the large metacentric height of 8.2 feet, and many proposals were considered with a view to minimizing an obvious drawback for a steady gun platform. Eventually an arrangement officially termed "water chambers" was devised to counteract the roll, those mainly responsible for its inception being Mr. (afterwards Sir) Philip Watts and the Captain of the ship who later became Admiral of the fleet, Lord Fisher. The water chambers comprised two tanks extending across the vessel and partially filled with water which ran to the lee side as the ship rolled. At small angles of heel this was found to be more efficacious than bilge keels but less so at large angles. It was also found that the most suitable depth of water in the tank was that which caused a side-to-side movement in equal time to the period of the ship. The system, however, was not adopted in succeeding craft probably because at that time naval design was very much in the melting pot, each successive production being different from its predecessor.

Extensive experiments with bilge keels were also conducted at about this time; and after numerous reports and conclusions, some of which were controverted in practice, it was finally proved that fittings of this description were a necessity for large vessels, when the "Royal Sovereign" class of battleship appeared in 1891-1892.

Another early stabilizing device was a weight actuated by hydraulic means and automatically moved from side to side in time with the rolling of the ship. This was tried by the late Sir John Thornycroft in the small steam yacht Cecille and whilst satisfactory results were obtained, the apparatus was not apparently fitted in any other vessels probably on account of mechanical difficulties likely to be encountered if applied to larger craft.

In 1910 the water chamber idea of the old Inflexible reappeared in a modified form in Germany as the antirolling tank and was installed in a number of prewar liners including the Aquitania, one of the first being the Hamburg-American Ypranga from which some very interesting data were obtained. The general results, however, appear to have been varied, especially in the



The famous British iron-clad turret warship Inflexible, the first vessel to use water chambers to compensate for roll.

case of two 24-knot Belgian cross-channel packets Ville de Liege and Stadt Antwerpen. These vessels, which operate close to the scenes of the earlier exploits of the Bessemer and Castalia, are 300 feet in length with 36 feet beam and had the tanks fitted on the boat deck immediately aft of the bridge. The effect was opposite to what was intended but it should be noted that according to a report published in 1913 dealing with the general effects of water chambers on the rolling of ships, the action of the tank is useless and disadvantageous among very short waves, a type of sea which actually prevails in the Strait of Dover. The antirolling tanks on Aquitania are now used as fuel oil bunkers.

Post-war developments of the antirolling tank are embodied in the Hamburg-American liners of the Albert Ballin class, whilst the plans of the Bremen show two fittings of this description each 65 feet, 6 inches long located between the two groups of boilers. The application of external bulges such as were fitted to the North German Lloyd motor liner Fuloa of 1922 has also received due consideration, but it would appear that difficulties are likely to be encountered owing to increased resistance.

Experiments were also carried out in Germany in prewar days with gyroscopic stabilizers under the direction of Herr Schlick, and excellent results are stated to have been obtained with a small torpedo boat equipped with apparatus of this description. In the Conte di Savoia there are to be three 13-foot Sperry stabilizers, the electrical equipment of which is to be supplied by the Metropolitan Vickers Co. and the mechanical portions by Vickers Armstrong.

A Unique Ferry Reconstruction

Fin Keel and Long Outboard Propeller Shafts Transformed Shallow Draft Steel Hull of Side-Wheeler to Diesel-Driven Double-End Propeller Ferry

By Charles F. A. Mann

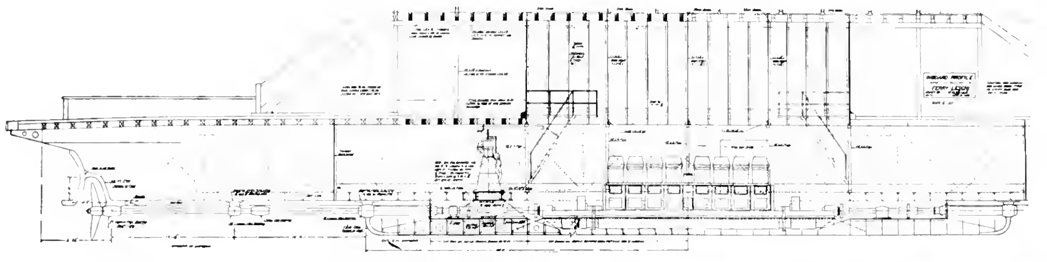
ANOTHER of the Northwest ferry fleet has been converted from steam to diesel power, and this time a unique piece of hull design was used to carry out the job, that of building a bulb fin into the bottom of the hull, midships, to carry the engine, allow full headroom, and get propeller submersion in a shallow draft boat. This ferry, the famous old side-wheeler Leschi, built in 1913 by the King County Commissioners for inauguration of fast ferry service between Leschi Park, Seattle, and Medina, served for fifteen years on a daily schedule, but was eating up her value in fuel oil every two years and not developing sufficient speed.

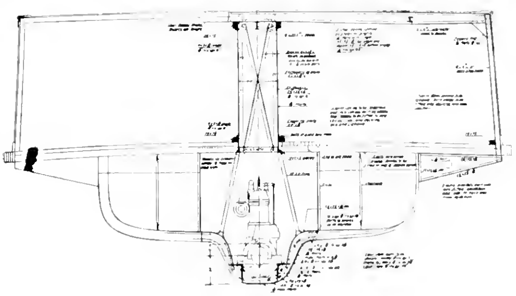
Captain J. L. Anderson, operator of the Lake Washington ferry system and president of the Kitsap County Transportation Company, commissioned Walter D. Lynch to prepare plans for conversion of the Leschi last winter, and a contract was let to the Lake Washington Shipyards for this work. The Leschi is 169 feet long, 52 feet beam overall, 33 feet molded, 4 feet 6 inches draft. Her former power was two 16 by 72-inch inclined steam engines driving 16-foot paddle wheels. Owing to excess layover losses and the shortness of the run (2-1/8 miles) her fuel consumption was beyond all reason, and it was decided to rebuild her shallow steel hull for diesel drive

Installation of diesel in the old hull would not work out, owing to insufficient submersion of propellers. After studying the problem, Captain Anderson decided to try installation of an elliptical bulb "fin" on the bottom of the hull, and use an 8-cylinder Washington diesel engine, with a double clutch system, driving a propeller at each end, with long shafts carried underneath the old hull on three lignum vitae bearings.

This steel bulb, or fin, is 80 feet long, 10 feet wide, and 4 feet 2 inches in depth, just big enough to accommodate the diesel enbine. Steel gratings are laid over the space between the main engine and the old floor level of the hull proper, and auxiliary power is carried on the original floor level of the hull. Regular stern frames are fitted into each end of the bulb, and a wheel aperature is cut up into the old hull just forward of the original stern post at each end. The space freed by cutting down the width of the engine trunk and by the elimination of the paddle boxes increases the capacity of the ferry by 12 cars.

A 560-horsepower, 8-cylinder, Washington diesel engine, with cylinders $14\frac{1}{2}$-inch bore and 18-inch stroke, turning propellers 79 by 71 inches at 250 revolutions per minute, drives the Leschi at 11 knots top speed, and a working speed of $10\frac{1}{2}$ knots, which is sufficient to maintain a round-trip schedule of 35 minutes. A single control lever handles the oil fuel injection pres-





A NOTABLE HULL CONVERSION.

A partial inboard profile and the transverse section of the Puget Sound motor ferry Leschi showing the fin bulb keel to take the diesel engine and propeller shafting. Note the long outboard shafting with bearings and struts and the longitudinal lattice truss for strengthening the hull. Puget Sound ferries are rapidly becoming one hundred per cent. motorized.

sure and the governor. One-way clutches at either end of the engine, controlled by a single hand-wheel, allow the engine to turn at mean operating speeds at all times. One propeller always rides free, and the engine is nonreversing.

Auxiliary power is provided by a 44-horsepower Washington diesel directly connected to a 26-kilowatt General-Electric generator, belt driven off the main engine flywheel. A 56-cell, 240-ampere hour capacity National storage battery installation provides emergency lighting.

A 2-stage Moran centrifugal fire pump driven by a 20-horsepower Westinghouse motor with fire main outlets and hose reels protect all parts of the hull; and batteries of Pyrene fire extinguishers insure against spread of fire from automobiles.

Captain Lynch declares that the fuel bill of the new Leschi will be less than one-tenth that of the old ferry and that the cost of this new installation and reconstruction will write itself off in a short time.

Bow view of the Leschi before and after conversion.

A Revolving Beacon for United States Lighthouses

A NEW type of revolving beacon, having two 36-inch lenses, is being introduced into lighthouse work, it having proved satisfactory for the lighting of airways, according to the Lighthouse Service, of the Department of Commerce. This new type of light differs considerably in construction from the illuminating apparatus which in the past has been used in lighthouses.

The new beacons, of weather-proof construction, lend themselves to installation on skeleton steel or similar towers. The motor which revolves the beacon, producing the flashes, is contained within the base, and the entire beacon is so constructed that it will operate for long periods without attention. Electric current is used both as the illuminant and for driving the motor. The possibility of the light failing through the burning out of a bulb is guarded against by a lamp changing device: when one lamp burns out, another is instantly swung into position.

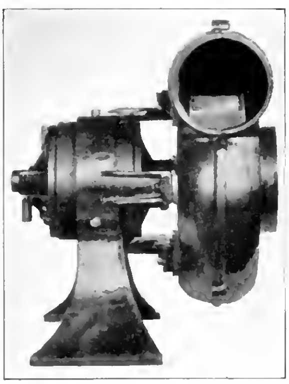
With a 1000-watt lamp the new beacons send out a beam of light of 1,200,000 candlepower, and with simple alterations the light may be made alternating white and red, white and green, or red and green. The speed of revolution may also be varied between limits of 2 to 6 revolutions per minute.

Marine Refrigeration

(Continued from Page 283)

fective but portable baffle board which clears the coils by at least two inches. The baffles are usually made of two courses of tongue and grooved lumber, laid at right angles to each other, with two layers of waterproof paper between. The baffles should clear the ceiling and floor by approximately 8 inches, and the coils should be closed over their ends. This not only protects cargo from contact with coils, but augments the air movement past the coils due to the natural down draft produced. The coil face of the baffles should be water-proofed and the cargo face shellacked.

Openings. For doors and hatches, the best is none too good. The frames should be of heavy construction and the door heavily insulated. The minimum opening width should be four feet wherever possible, and the frame and sill should be lined with heavy galvanized iron to protect them from damage by cargo movement. The doors should be well gasketed to prevent air leakage. The hardware should be extra heavy. Spring type hinges will insure close fitting of door, and the latches or hasps should permit effective locking to prevent the entrance of unauthorized persons.


Ilg Blower of a type often used for positive circulation of air in cold storage chambers aboard ship.

New Puget Sound Motor Ferry Rosario

Exterior view of the motor ferry Rosario and interior of her observation lounge.

ONE of the latest of the new de luxe Puget Sound motor ferries is the motorship Rosario, formerly the old steam ferry Whidby Island of Seattle. Her owners, the Puget Sound Navigation Company, decided early this year to build a deluxe ferry for the San Juan Island route and ordered plans prepared for lengthening and widening the hull and installing a 600-horsepower diesel engine.

She was taken out of the water at the Seattle plant of the Ballard Marine Railway Company, cut in half, and 300-feet length and 8-feet beam were added amidships. Of heavy wood construction, the keel is a laminated construction of long, clear fir timbers bolted together. This ferry is now 150 feet long, 40 feet beam, and 8 feet draft, with a capacity for 40 automobiles. She has a turn-table large enough for trucks on her bow for making head-on landings in the deep coves of the San Juan group, and for making landings in all ranges of tides. Her mechanical equipment consists of a 6-cylinder, 600-horsepower, Bolinder diesel engine, with a Fairbanks-Morse auxiliary generating set, and a layout of General-Electric motor-driven pumps. The main engine turns at 185 revolutions per minute and drives a 7-foot 8-inch diameter Simonds propeller.

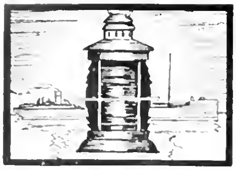
The entire cabin was rebuilt and was equipped and furnished in luxurious style to comfortably accommodate 200 passengers. All cabins are paneled in mahogany, finished light, ceiling illumination installed with recessed light fixtures. Life preservers are carried in concealed panels extending from the deck to ceiling. Goodyear rubber tile flooring is laid in the three main cabins and the dining saloon. The lavatories are fitted with hard white tile floors, and Standard plumbing fixtures are installed. Galley equipment includes a large Lang range, with Buell oil-burning system, and a Frigidaire, as well as an automatic water system and a special water heater.

The company's marine superintendent, J. E. Murphy, was in general charge of the rebuilding of the Rosario, which is estimated to have cost nearly $100,000. The entire top deck has been enclosed and fitted with 300 collapsible seats for outdoor observation. Over 200 upholstered chairs, made by the Washington Furniture Manufacturing Co., were used in the cabin. A radio receiving unit with three well located loud speakers furnishes program and news service to passengers.

In the Days of Wooden Ships and Iron Men

Reproduced through courtesy of M. Behrman, Oakland.

This picture is reproduced from a copy of the oldest photograph of San Francisco in existence. It shows the great fleet of deserted sailing ships in San Francisco Bay in 1851. The present office of Pacific Marine Review is directly over the Figure 7, which marks the corner of Clay and Sansome Streets.



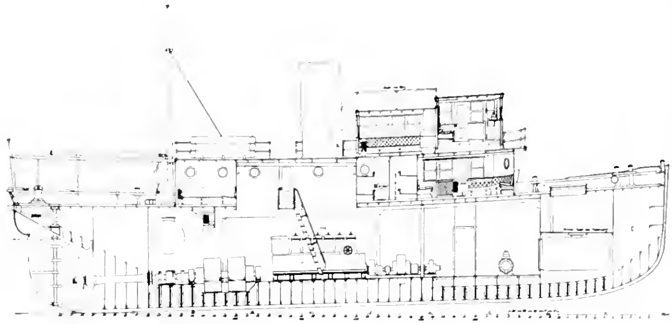
Marine Equipment

QUARANTINE TUG ~ CLOG PROOF PUMPS
SPHERICAL COMPASS ~ PILOT HOUSE CONTROL

New Diesel-Electric Quarantine Boat

A NEW diesel-electric boarding tug is now being constructed by the Spedden Shipbuilding Co., Inc., Baltimore, Maryland, for the Foreign Quarantine Division of the Public Health Service and will be attached to the U. S. Quarantine Station at Rossbank, Staten Island, New York, where her chief function will be the transportation of Public Health Service doctors from quarantine to ships entering New York from foreign ports.

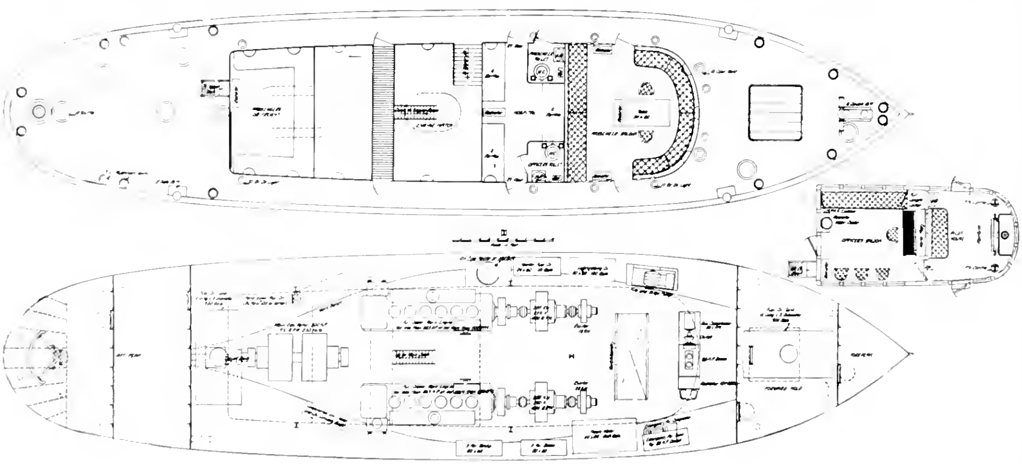
The vessel was designed by P. W. Clark, naval architect, Washington, D.C., and is 100 feet 8 inches in length over-all, 22 feet molded beam, and 11 feet loaded draft. She will be propelled by two 325-horsepower Fairbanks-Morse diesel engines, each driving a 205-kilowatt Westinghouse generator which will furnish current to the Westinghouse main electric propulsion motor developing 500 horsepower at 175 revolutions per minute. The Columbian propeller will be designed for a speed of 12 knots.



Inboard profile of quarantine boat.

The heavy type of construction which characterizes the vessels of the Quarantine fleet will be used on this vessel. In addition to four transverse bulkheads there will be five web frames, each 10 inches deep, and intermediate hull frames will be 5-inch bulk angles. The main deck is supported by five steel pillars.

One of the interesting features of this vessel is that the shell plates and rivets used below the waterline will be genuine wrought iron. This material was adopted to combat the excessive corrosion which has been taking place in the under bodies of steel vessels. Another feature of interest is the absence of interior sheathing in the steel house; all framework will be visible for easy maintenance to combat corrosion. Considerable attention is



General arrangement plans.

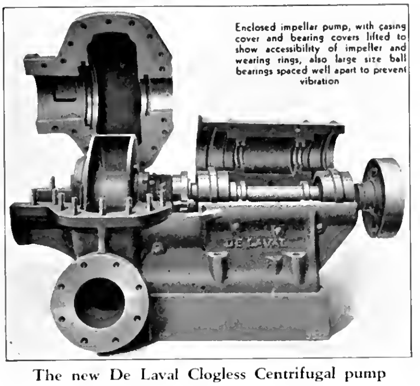
paid to ample ventilation below decks and other enclosed spaces are provided with mushroom ventilators to provide ample air supply as a means of reducing sweating and its attendant corrosion.

The house will be of wooden construction. The pilot house will be fitted for complete pilot house control, one-man operation, having both port and starboard control pedestals.

The auxiliary machinery will consist of a Fairbanks-Morse auxiliary air compressor generator unit consisting of a 30-horsepower diesel engine direct-connected to a 20-kilowatt, 110-volt generator and clutch connected to a 50 cubic feet per minute air compressor. Emergency starting air can be supplied by a 3-horsepower Mianus air compressor if required. All pumps—fire, bilge, and auxiliary oil and water—will be Fairbanks, Morse & Co. make; the heating system will be of the hot water type, supplied by an oil-burning Arco boiler. The electric steering gear will be supplied by the American Engineering Company. The main switchboard will be forward and for emergency use only.

Clog-Proof Centrifugal Pumps

THE Clogless pump which is shown in the accompanying illustration has been developed by the De Laval Steam Turbine Company particularly for handling sewage, paper pulp, and similar liquids. The casing is split in the plane of the shaft, with the discharge connection in the lower half, or casing proper. The casing cover can, therefore, be lifted off without disturbing the discharge pipe connection and after only partial unbolting of the suction pipe connection. A large handhole, with easily removable cover, is located on the cover half of the suction nozzle, to give quick access to the suction side of the impeller for inspection and cleaning. The suction nozzle is designed for a large size suction pipe, insuring low pipe velocities and low total suction head, which is conducive to smooth and efficient operation of the impeller.



The new De Laval Clogless Centrifugal pump of the enclosed impeller type.

The lower half, or pump casing proper, has cast integral with it a pedestal or supporting foot, which is designed to be bolted directly to the bedplate of motor or engine-driven units. The pump volute or body is overhung, making the piping connections easily accessible. The seats for the bearings, the packing gland, and the sealing ring recesses are all bored at one setting, insuring perfect alignment.

Passages through the impeller are extra wide, both between the side plates and between the vanes. Ordinarily only two vanes are used, proper guiding of the liquid without cavitation or shock being attained by suitable selection of the speed and of the impeller diameter. Because of these characteristics the present pumps, which are operated at slow speed, have been made to compare favorably in efficiency with standard high-speed, clear-water pumps.

At the joint between the impeller and casing, the impeller is protected by a bronze ring threaded upon it, while the casing is protected by a stationary bronze ring seated in recesses formed in the casing and casing cover and, therefore, removable when the cover and rotor are lifted. A circumferential slot in the stationary ring communicates with a tapped opening through the casing cover to provide for sealing with clear water under a pressure slightly higher than that generated by the pump, in order to prevent liquid and abrasive matter handled by the pump from entering between the rings.

In order to avoid too great overhang of the shaft, the stuffing box is located over the impeller hub, which is protected by a renewable bronze sleeve. A tapped opening in the casing cover provides for the introduction of clear sealing water.

Ball bearings are used, the one next to the impeller being of the duplex type and arranged to take all unbalanced thrust, including the weight of the impeller and shaft when the pump is installed with the shaft vertical. A flexible coupling which will not transmit end thrust and which allows for unavoidable misalignment is used to connect the pump shaft to the driving shaft, the pump half of the coupling being mounted upon a taper fit to permit easy removal.

For vertical shaft operation the pedestal or foot of the pump can be bolted to I-beams, or channels, involving no change whatever from the horizontal design; or a semicircular foot for supporting the pump on the floor can be cast as part of the casing.

This pump would be ideal for handling sewage and bilge sludge aboard ship.

New Flexible Steel for Electric Conduits

RIGID conduit whose smaller sizes can be bent across the knee without tools is the newest improvement in wiring construction materials announced by the Merchandise Department of the General Electric Company, Bridgeport, Connecticut.

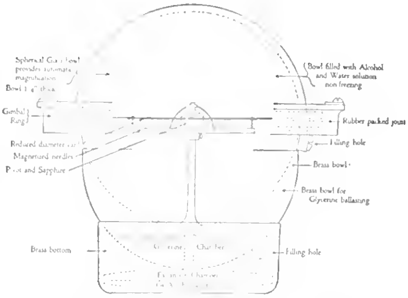
The easy-bending properties have been obtained along with other desirable characteristics. The new conduit threads more easily, giving a clear-cut, firm-holding thread. The steel is fine-grained and of uniform quality, so that the pickling and galvanizing processes give a smooth product. The new conduit also is cut more easily.

The easy-bending quality of the new rigid conduit is the result of the development of a new kind of flexible alloy steel, now used in all General-Electric rigid conduit in the sizes that are adapted to hand-bending. Its flexibility also assures freedom from breaks that occur with more brittle types of conduit.

This new conduit should be especially interesting to marine electrical contractors as its flexibility enables easy adjustment to the many curves of naval architecture.

The New Spherical Compass

KELVIN and Wilfred O. White Company of Boston have recently perfected and are now distributing the Kelvin-White spherical compass, a unique design said to be the most positive type of magnetic compass yet developed. This compass has three principal features, as follows:



Diagrammatic elevation of the new Kelvin-White spherical bowl compass.

First the bowl is a perfect glass hollow sphere completely filled with a nonfreezing water and alcohol solution. The top half of this bowl makes a meniscus lens enabling the card to be read from almost any angle and at considerable distance.

Second the card is of a new design with inertia refined to such a degree that if disturbed from the meridian, the magnetic power of the needle is ample to bring it back quickly without the usual amount of overswing.

Third the bowl damping device is a separate chamber below the bowl itself, partially filled with glycerine. This dampens out very effectively any oscillation imparted from the movements of the vessel, and thus provides the card with a steady platform.

These compasses use the new Kelvin-White copyrighted design card which has a 360-degree graduated circle superimposed on the "¼-point" card in such fashion that both are very legible.

The new compass is fitted to binnacles in the same manner as standard compasses. A spun brass night hood equipped with electric light and a simple but very effective azimuth circle are available for use with the spherical bowl. The new compass is now available in 4-inch, 5-inch, 6-inch, and 7-inch sizes.

An enthusiastic California yachtsman and marine engineer who was recently in Boston informs us that this new compass is one of the "slickest improvements I have seen in many a long day. I was so intrigued that I spent three hours of precious time playing with one and could hardly tear myself away Ten feet off from any angle I could read the card plainly."

Clean Lubrication for Marine Engines

MODERN, high speed, internal combustion engines entirely enclosed and fitted with pressure flow lubricating systems demand clean lubricating oil for efficient service and have presented to engineers the problem of designing a continuous-flow oil filter of light weight and compact form that would be an integral part of the engine assembly.

The requirements for such a filter are:

First—that it remove all grit, dirt, carbon, water, and sludge from lubricating oil without developing too much back pressure on the system.

Second—that adequate means be provided for easily removing from the filter all accumulation of these impurities at periodic intervals.

Third—that the filter be built as an integral part of the engine so that on the very first test run of the engine its oil would be running through the filter thus saving the bearings from the abrasive and cutting action of metallic particles, sand, and grit which are loosened from the various engine parts during the running in test of the engine.

In H-W Filters, the Michigan Products Corporation of Detroit is confident that this problem has been solved. The design of H-W Filters is the joint product of the knowledge and skill of Colonel E. J. Hall of Hall-Scott Motor fame and of Charles A. Winslow.

This fitting consists of a cylindrical filter element surrounding a tube and itself surrounded by a metal shell, all supported on a metal base that forms a flange for attachment to the engine frame, and is suitably drilled to control the flow of oil into and out of the filter element. In normal operation the oil flows into the outer shell and through the filter material from the outer or larger diameter of the cylinder to the inner or smaller diameter.

Two types are manufactured, the difference being that Type 2 has an automatic reverse valve in the base so that it may be cleaned by reversing the flow of oil. Both types have a differential ball valve connecting the inlet and outlet so that stoppage of filter unit will automatically by-pass the oil flow.

At the top of the outer shell is a knurled nut covering a nipple connecting with a standard pneumatic valve. At the bottom of the base is a large drain plug. For cleaning the filter the operator removes the drain plug and knurled nut, applies an air hose, and blows the impurities out of the filter element and through the drain.

With Type 2 the removal of drain plug automatically reverses the flow of oil and the impurities are carried off through the drain.

These filters are being adopted as standard equipment on several well known lines of marine engines, both diesel and gasoline.

The illustration at left shows the Type 2 H-W lubricating oil filter as applied to many marine and automotive engines.

Electric Control of Engine Throttle

IN addition to the many novel features of naval architecture incorporated in the new vessels building for the Ford Motor Company at the Great Lakes Engineering Works, it is understood that these vessels, although a large part of their operating time will be through the New York State Barge Canal, will be equipped with complete Sperry gyro-compass systems.

It is also reported that Sperry is manufacturing for these boats a system of electrical control of the main engine throttles which will enable the engines to be handled directly from the pilot house.

Because the wheelhouses of these vessels are to be arranged so that they can be lowered when passing under bridges, all controls between the vessel proper and the wheelhouse must be flexible. The throttle control system is electrical and will connect directly to the same shaft which is operated from the throttle lever in the engine room. The control mechanism in the wheelhouse will be similar to the standard double faced engine telegraph. A Sperry revolution indicator system will keep those in the wheelhouse informed as to just what the engines are doing at all times.

Circulation in Scotch Marine Boilers

By C. A. Seley, Consulting Engineer

IN the April, 1930, issue of this magazine, an article covering some research into Scotch boiler water circulation was given, in the form of an address made at Washington, to a conference meeting of the Supervising Inspectors of the U. S. Steamboat Inspection Service.

The tests of thermo-syphonic circulation, as described, were made on a three-furnace design of boiler, the two spaces between combustion chambers affording the heating surface for two paths when properly enclosed, providing for the upward direction of a complete cycle of circulation of the boiler water.

Other three-furnace boilers have since been similarly equipped and thermometer tests corroborate the results obtained from the initial installation, thus proving the correctness of the theory and method of its application.

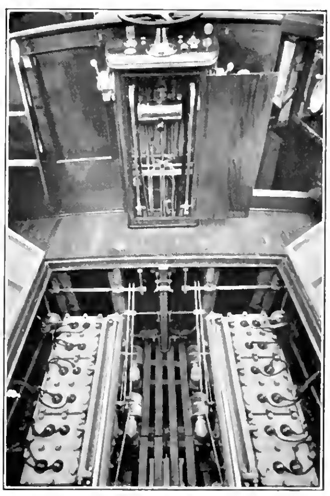
Considerable theorizing was indulged in as to whether this induced complete circulation would contribute tangible results of economies in operation. There was no doubt of the elimination of the stresses set up by the considerable range of structural temperatures, which seem to be inherent in Scotch boiler design. Some arrangements of feed-water piping were found to be contributing to the making of alternating stresses which are well to guard against in steam boiler structures.

Operation throughout eight months to a year in some cases, where fuel and mileage figures were available showed a fuel economy of 7 per cent. and 9 per cent., respectively, and no maintenance charges during the term of circulator application.

While the four-furnace Scotch boiler predominates in ocean-going craft, this design affords an opportunity with individual combustion chambers for three circulating passages, and the pronounced capacity as demonstrated on three-furnace boilers leaves no doubt of ability to properly circulate four-furnace boilers by this plan. There are, however, a great number of two-furnace Scotch boilers which, of necessity, have but one space between combustion chambers in which to arrange for circulation.

The first opportunity for testing out the capacity of such an arrangement came to hand recently, and a thermometer test showed that, when starting from cold water, 45 degrees Fahrenheit, and with a very slow fire, after the top water temperature passed 75 degrees, steam was raised to 160 pounds and with complete circulation in less than five hours.

This was maintained through several hours of lay-over, followed by six hours of operation at the full power of the ship, which was equipped with two 13-foot by 11-foot 6-inch, 180-pound Scotch boilers.

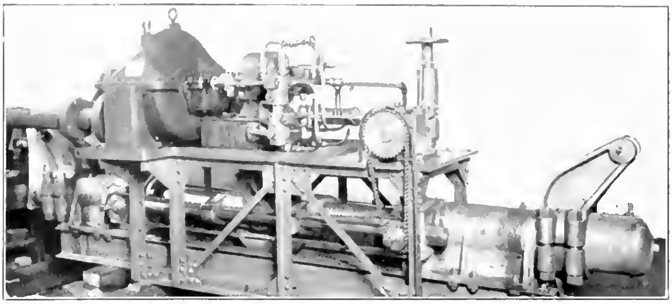


Cora S. III of West Palm Beach, designed by Henry C. Grebe & Co., and built by Great Lakes Boat Building Corp.; 46 feet long and powered with twin Sterling Petrel 6-cylinder engines rated 200 horsepower. At 2000 revolutions per minute she makes a maximum speed of 28 miles and a cruising speed of 25 miles per hour. At the right is shown the very neat engine installation and the throttle control from the navigating bridge.

An Interesting Steam Hydraulic Steerer

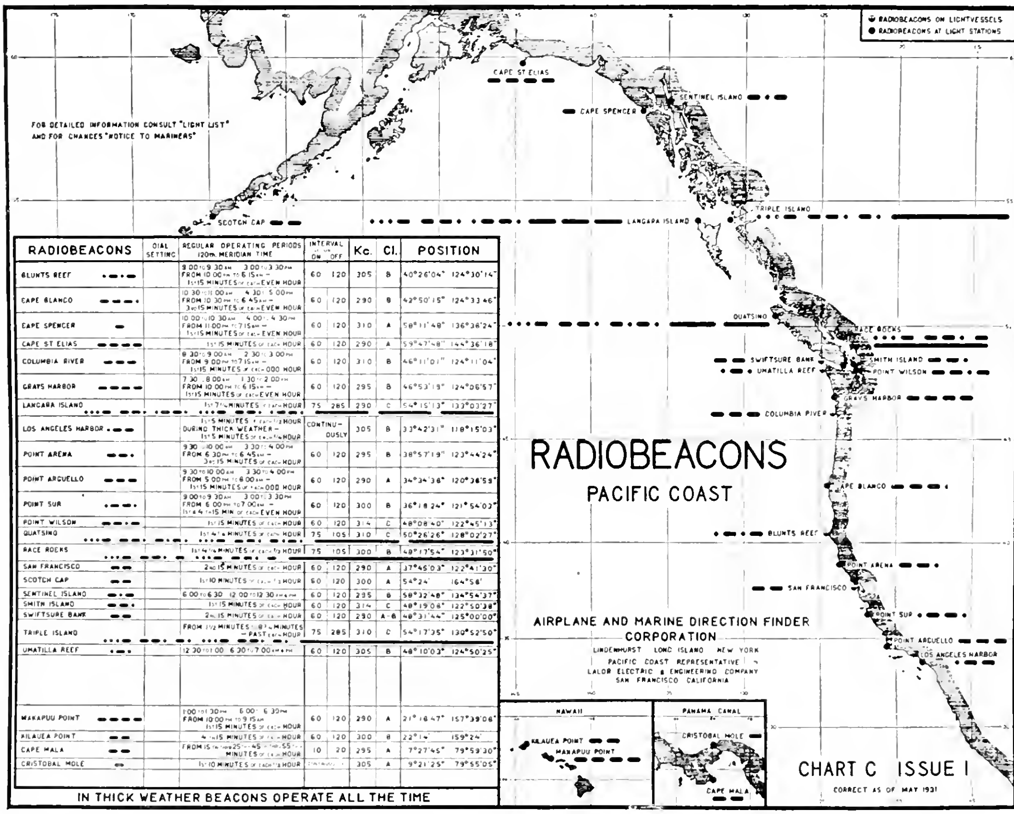
MANUFACTURERS of steering equipment are often called upon for special adaptations of their products. The American Engineering Company has recently solved an interesting problem along this line.

The steam hydraulic steering gear illustrated is for installation on a new tug being constructed for the Great Lakes Dredge & Dock Company at the yard of the Manitowoc Shipbuilding Company. This steerer is notable in that it adapts a steam turbine drive to the hydraulic pump. The steerer is of the well known patented hydraulic sheave type. The method pump control and full follow-up, with high and low speed governors on the turbine insures a minimum of steam consumption and at the same time gives all the flexibility and other advantages of electro - hydraulic gear.



The well-known patented A.E.C. hydraulic, sheve-type steerer adapted to steam turbine drive for the hydraulic pumps.

The design of this steerer makes a very compact, neat arrangement for installation at engine room bulkheads: and the structural steel frame combines accessibility, rigidity, strength, and low weight.



RADIOBEACONS	DIAL SETTING	REGULAR OPERATING PERIODS 120th MERIDIAN TIME	INTERVAL ON	INTERVAL OFF	Kc.	Cl.	POSITION
BLUNTS REEF		9.00 to 9.30 AM 3.00 to 3.30 PM FROM 10.00 PM to 6.15 AM — 1st 15 MINUTES of each EVEN HOUR	60	120	305	B	40°26'04" 124°30'14"
CAPE BLANCO		10.30 to 11.00 AM 4.30 to 5.00 PM FROM 10.30 PM to 6.45 AM — 3rd 15 MINUTES of each EVEN HOUR	60	120	290	B	42°50'15" 124°33'46"
CAPE SPENCER		10.00 to 10.30 AM 4.00 to 4.30 PM FROM 11.00 PM to 7.15 AM — 1st 15 MINUTES of each EVEN HOUR	60	120	310	A	58°11'48" 136°38'24"
CAPE ST ELIAS		1st 15 MINUTES of each HOUR	60	120	290	A	59°47'48" 144°36'18"
COLUMBIA RIVER		8.30 to 9.00 AM 2.30 to 3.00 PM FROM 9.00 PM to 7.15 AM — 1st 15 MINUTES of each ODD HOUR	60	120	310	B	46°11'01" 124°11'04"
GRAYS HARBOR		7.30 to 8.00 AM 1.30 to 2.00 PM FROM 10.00 PM to 6.15 AM — 1st 15 MINUTES of each EVEN HOUR	60	120	295	B	46°53'19" 124°06'57"
LANGARA ISLAND		1st 7½ MINUTES of each HOUR	75	285	290	C	54°15'13" 133°03'27"
LOS ANGELES HARBOR		1st 5 MINUTES of each ½ HOUR DURING THICK WEATHER — 1st 5 MINUTES of each ¼ HOUR	CONTINUOUSLY		305	B	33°42'31" 118°15'03"
POINT ARENA		9.30 to 10.00 AM 3.30 to 4.00 PM FROM 6.30 PM to 6.45 AM — 3rd 15 MINUTES of each HOUR	60	120	295	B	38°57'19" 123°44'24"
POINT ARGUELLO		9.30 to 10.00 AM 3.30 to 4.00 PM FROM 5.00 PM to 8.00 AM — 1st 15 MINUTES of each ODD HOUR	60	120	290	A	34°34'38" 120°38'59"
POINT SUR		9.00 to 9.30 AM 3.00 to 3.30 PM FROM 6.00 PM to 7.00 AM — 1st & 4th 15 MIN of each EVEN HOUR	60	120	300	B	36°18'24" 121°54'03"
POINT WILSON		1st 15 MINUTES of each HOUR	60	120	314	C	48°08'40" 122°45'13"
QUATSINO		1st 4¼ MINUTES of each HOUR	75	105	310	C	50°26'26" 128°02'27"
RACE ROCKS		1st 4¼ MINUTES of each ½ HOUR	75	105	300	B	48°17'54" 123°31'50"
SAN FRANCISCO		2nd 15 MINUTES of each HOUR	60	120	290	A	37°45'03" 122°41'30"
SCOTCH CAP		1st 10 MINUTES of each ½ HOUR	60	120	300	A	54°24' 164°58'
SENTINEL ISLAND		6.00 to 6.30 12.00 to 12.30 AM & PM	60	120	295	B	58°32'48" 134°54'37"
SMITH ISLAND		1st 15 MINUTES of each HOUR	60	120	314	C	48°19'08" 122°50'38"
SWIFTSURE BANK		2nd 15 MINUTES of each HOUR	60	120	290	A-B	48°31'44" 125°00'00"
TRIPLE ISLAND		FROM 1½ MINUTES to 8¾ MINUTES — PAST each HOUR	75	285	310	C	54°17'35" 130°52'50"
UMATILLA REEF		12.30 to 1.00 6.30 to 7.00 AM & PM	60	120	305	B	48°10'03" 124°50'25"
MAKAPUU POINT		1.00 to 1.30 PM 6.00 to 6.30 PM FROM 10.00 PM to 9.15 AM 1st 15 MINUTES of each HOUR	60	120	290	A	21°18'47" 157°39'08"
KILAUEA POINT		4th 15 MINUTES of each HOUR	60	120	300	B	22°14' 159°24'
CAPE MALA		FROM 15 to 25 — 45 to 55 MINUTES of each HOUR	10	20	295	A	7°27'45" 79°59'30"
CRISTOBAL MOLE		1st 10 MINUTES of each ½ HOUR	CONTINUOUSLY		305	A	9°21'25" 79°55'05"

IN THICK WEATHER BEACONS OPERATE ALL THE TIME

The radio beacon chart reproduced above is published by the Airplane and Marine Direction Finder Corporation for the convenience of mariners. Copies in convenient chartroom size mav be obtained through the Lalor Electric and Engineering Co., San Francisco.

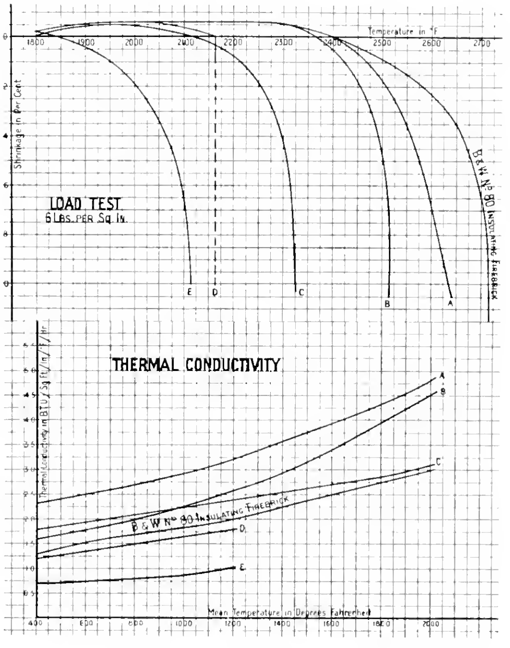
A New Insulating Firebrick

THE Babcock & Wilcox Company announces a new insulating firebrick known as the B.& W. No. 80 Insulating Firebrick. Although this material has previously been made experimentally, no practical method of manufacturing it in brick sizes has been developed until recently. The company has now installed the necessary equipment and is producing on a commercial scale.

The No. 80 Insulating Firebrick is an entirely new building material for furnace work. Its insulating properties are better than a number of high grade insulators, and in addition it has refractory qualities which compare favorably with any high grade firebrick. The accompanying curves show clearly that the insulating qualities of this new firebrick are superior to other high temperature insulators. The second curve shows No. 80 Insulating Firebrick superior to all others tested in point of resistance to deformation under load at high temperatures.

When used as linings for intermittent furnaces, the No. 80 Insulating Firebrick will result in very great fuel savings during the heating up periods. As an example, a furnace lined with No. 80 Insulating Firebrick and designed to have the same heat flow through the walls as one lined with firebrick will have about one-sixteenth the heat storage capacity. As the heat storage capacity of any furnace depends on the weight of the heated furnace structure and the depth of heat penetration, it is easily seen that since a furnace built of 18 inches of firebrick backed with 2 inches of insulating block has the same heat flow through the walls as one built of 4½ inches of No. 80 Insulating Firebrick and 2 inches of insulating block that there is a weight ratio alone of one to sixteen, or, in other words, the furnace lined with No. 80 Insulating Firebrick has only 6¼ per cent. of the heat storage capacity of the firebrick lined furnace.

A practical demonstration of this has been made with a furnace which has a wall nine inches thick and operates with a wall temperature of 2850 degrees Fahrenheit. After thermal equilibrium has been reached a bare hand can be placed on the outside of the wall without discomfort, the surface temperature being about 100 degrees Fahrenheit.



Curves showing the results of tests of the new Babcock & Wilcox insulating firebrick for structural strength and for thermal conductivity.

The brick may be used without a facing of firebrick on the furnace side, exposed to furnace temperatures and gases and protected only by a coating of No. 80 high temperature or patching cements. The brick is suitable for lining oil- and gas-fired furnaces, electric furnaces of the resistance type, and for coal-fired equipment wherever it may be used in protecting wall areas not exposed to mechanical abrasion and slag action. These bricks are extremely easy to handle and may be cut, drilled or shaped with ordinary wood-working tools.

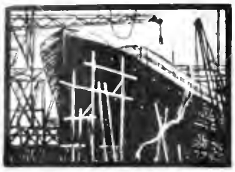
Book Review

THE MOTOR SHIP REFERENCE BOOK FOR 1931. 263 pages, neatly bound in cloth with numerous illustrations and tables. Published by The Temple Press, Ltd., London, England. Price 5/- net.

This very useful compilation represents the seventh annual edition of the work. In it is contained a description of every important marine diesel engine now built for installation in large ships, together with a photographic reproduction or a sectional drawing, and in some cases both. All the new engines developed in 1930 are included.

There is a table giving particulars regarding dimensions, machinery, builders, and other information relating to every motorship now on order throughout the world, also similar details of all motorships of over 1000 tons gross built in 1930. This is in addition to the list of motorships already in service before 1930. The progress of marine oil engines and motor shipbuilding during the past year is dealt with at some length and the new regulations of Lloyd's Register of Shipping concerning motorships are added.

Electric Equipment for Zeppelin.—The world's largest dirigible, the Navy ZRS-4, being manufactured by the Goodyear-Zeppelin Corporation in Akron, and described on another page of this issue, will be completely electrified, the order for all the electrical equipment having been placed recently with the Westinghouse Electric and Manufacturing Company.



American Shipbuilding

Edited by H. C. McKinnon

To Bid on Destroyers.—According to an announcement made by George Armes, president and operator of the Los Angeles Shipbuilding & Drydock Company of San Pedro and the General Engineering & Drydock Company of San Francisco and Oakland, it is his intention to submit bids for the construction of one or more navy destroyers, plans and specifications for which will be ready for the shipyards this month. Either of the shipyards operated by Armes is suitable for the building of destroyers, and it is earnestly hoped that some of the work may be brought to a Californa yard.

Mr. Armes stated further, that the passage of the Carter Bll at the next session of Congress that would give to Pacific Coast yards ½ per cent. preferential differential on loans for naval construction would be of considerable assistance to Pacific Coast shipyards in obtaining government contracts.

Let all Pacific Coast representatives in Congress get behind the Carter bill at the next session of Congress!

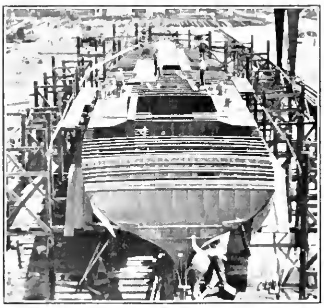
Ownership Change in Marine Repairs.—Marine Repairs, Inc., San Francisco, is a company which was formed several years ago jointly by the Matson Navigation Company and the Bethlehem Shipbuilding Corp., Ltd., Union Plant, for the purpose of performing voyage repairs to Matson vessels and others seeking such service. The Bethlehem interests have withdrawn from ownership in this company, and it is now owned by the Matson and G. K. Nichols, manager of Engineering and Repairs for the steamship line.

Bids on Pipe-Line Dredge.—Nashville Bridge Company was low bidder for the construction of a 16-inch, self-propelled, pipe-line dredge for the U. S. Engineers Office, Vicksburg, on a tender of $293,700 and 360 days for construction.

Seattle Plant Supplies Diesel.—The Washington Iron Works, Seattle, Washington, builder of the Washington diesel engine, recently received an order for a 1000-horsepower unit to be installed in the new 206-foot steel vehicular ferryboat for the Delaware-New Jersey Ferry Company building at the Wilmington yard of The Pusey & Jones Corp.

Contract Signed for Survey Vessel.—Formal contract was recently signed by the Canadian government and the Collingwood Shipyards, Ltd., Collingwood, Ontario, for the construction of a hydrographic survey vessel to be 214 feet between perpendiculars, 36 feet beam. She will have twin screws propelled by triple expansion steam engines developing 1200 indicated horsepower. Steam will be supplied by two Scotch boilers. The vessel will have a speed of 12 miles loaded.

Battleship to be Modernized.—The Norfolk Navy Yard will perform the work of modernization to the U. S. S. Idaho beinning about October 1. The work will include installation of additional armored deck protection for defense against submarines and aircraft; increasing elevation of turret guns from 15 to 30 degrees, installation of eight 5-inch anti-aircraft guns and of latest type tripod masts; latest type airplane handling and launching facilities; improvements in propulsion machinery and fire-control systems. During its last session Congress appropriated $10,000,000 for the start of the work of modernizing the battleships Idaho, Mississippi, and New Mexico, which is expected to total $30,000,000.



Progress picture showing work on the steel lighthouse tender Columbine, as of June 1, under construction at the Oakland yard of The Moore Dry Dock Co. The keel for the Columbine was laid on April 23 and she will be launched about July 27.

Keel of the San Diego ferryboat was laid at this yard on May 28 and launching scheduled for August 20.

Bids have been opened by the Department at Washington for the furnishing of propulsion machinery, ranging, on different classification bids from $1,000,420 to $2,128,26C. The companies submitting tenders are: Bethlehem Shipbuilding Corp., Ltd., Westinghouse Electric & Mfg. Co., New York Shipbuilding Company, De Laval Steam Turbine Company, Capstaff-Hunter Turbine Works, and Northern Pump Company.

New Tenders Asked on School Ship Reconditioning. — The U. S. Navy Department, Washington, D. C., which has donated the ex-Shipping Board freighter, Henry County, to the State of California for nautical school ship purposes, has rejected all bids received for her reconditioning by the Board of Governors for the school ship, and new tenders will be asked in accordance with specifications prepared by the Navy Department. Bids will be asked from the Mare Island Navy Yard as well as commercial yards prepared to handle the work. Captain Emile Topp is now in Washington in connection with this matter.

On June 19 tenders submitted under specifications prepared by the California Board of Governors were opened in the office of John C. Rohlfs, chairman. They were as follows:

General Engineering & Drydock Co., $189,000 and 90 days; Bethlehem Shipbuilding Corp., $210,042 and 90 days; The Moore Dry Dock Co., $235,110 and 120 days; and estimate of $294,285 from the Mare Island Navy Yard, with no time specified. These tenders include work of installation accommodations for 120 officers and men and other necessary work to put the California State in a seaworthy and practical condition for nautical school purposes.

Mare Island Manager Transferred.—Captain C. W. Fisher, U. S. N., who has been industrial manager of the U. S. Navy Yard at Mare Island, California, has been transferred to the Board of Inspection and Survey at San Francisco. He has been succeeded at Mare Island by Captain Waldo P. Ruley, formerly on the U.S.S. California.

Submarine Contract Placed.—The Electric Boat Company, Groton Conn., was awarded for the submarine Cuttlefish SC5 (ex V-9) have been received by the Navy Department.

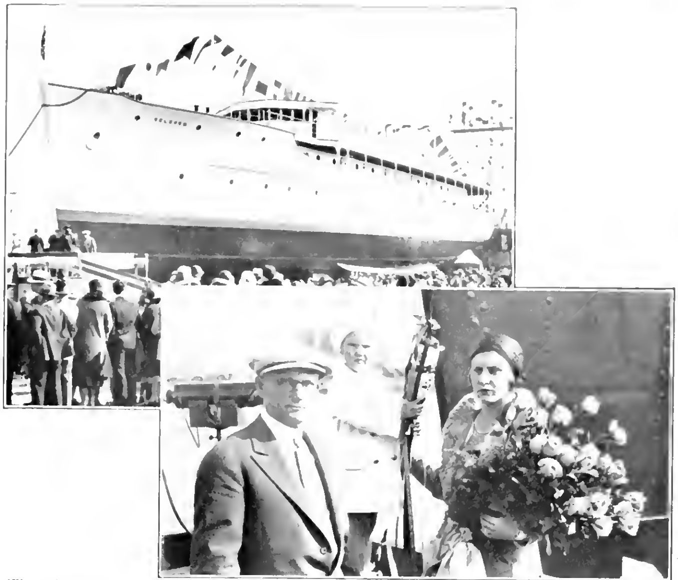
One of the Electric Boat Company's tenders was of $3,297,000, the submarine to be built on hull and machinery designs of the department and to be delivered within 30 months. The second and third bids were based on two different hull designs drawn up by the company, the machinery design being that of the department. They were for $3,297,000 and $3,395,000.

Bid submitted by the New York Shipbuilding Company was for $3,150,000; the craft to be built on the department's hull design, but the department to furnish the machinery and delivery to be made within 30 months.

The new submarine will have a displacement of 1100 tons, although original designs provided for a surface displacement of 1550 tons.

San Francisco Plant Gets Equipment Order.—Contract for making 26 combination feed check and stop valves for the two steamers now building for the United States Lines by the New York Shipbuilding Company has been awarded to the United Engineering Company of San Francisco. This particular type of valve, for which Hough & Egbert of San Francisco hold the patents, is made of chrome nickel steel and each valve weighs 500 pounds. They are being shipped East as fast as they are finished.

Another Ferry for New York. — According to reports from the East Coast, the Department of Plant and Structure of the City of New York plans the construction of another ferryboat similar to the Murray Hill recently completed by the Todd Dry Dock, Engineering & Repair Corp. at Brooklyn.



The picture at top, shows the diesel cruiser Velero III ready for launching April 2 at the yard of the Craig Shipbuilding Company, Long Beach, California. The cruiser is engined by two 6-cylinder, 850 shaft horsepower Winton diesel engines. She was designed by G. Bruce Newby of San Pedro.

The lower picture shows her owner, Captain G. Allan Hancock of Los Angeles, his little granddaughter Patricia Anne Zeiser, who was the sponsor, and Captain Hancock's daughter, Mrs. Zeiser.

Dredge Contract Awarded.—Dubuque Boat & Boiler Works, Dubuque, Iowa, has received contract from the U. S. Engineers Office, Vicksburg, Miss., for the construction of a self-propelled, 16-inch pipe line dredge to cost $295,000.

Steam Dredge to be Built.—It is quite probable that the U. S. Engineers Office, St. Louis, Missouri, will call for bids for the construction of one 192-ft. steel hull 24-inch steam dredge instead of three as originally planned.

Tenders Rejected on Floating Derrick Construction. — According to the news we have received, the Bureau of Yards & Docks of the U. S. Navy Department, Washington, D. C., has rejected all the tenders for the construction of two floating steel derricks of 25 tons capacity, one for the Mare Island Navy Yard and one for the Submarine Base at San Diego. Low bids were submitted on four sets of specifications by the English Construction Co., Inc., of Washington, D. C. Others submitting bids were: R. W. Kaltenbach Corporation, Bedford, Ohio; Dravo Contracting Co., Pittsburgh; and Bethlehem Shipbuilding Corp., San Francisco. It is reported that the call for bids has been indefinitely postponed.

Mississippi Dredge to be Diesel Powered.—The 150-ft. diesel-electric combination hydraulic and clamshell dredge nearing completion for the Sternberg Dredging Company at the plant of the Nashville Bridge Company, is to be powered by two Busch-Sulzer diesel engines, each driving a 1000-kilowatt, alternating current, generator with direct-connected exciters. Two 300-horsepower, 600-revolutions per minute motors will drive the two tunnel-stern type propellers. The dredging and auxiliary machinery will be electric motor driven.

New Lighthouse Tender Planned.—The U. S. Bureau of Lighthouses, Washington, D. C., is said to be planning the construction of a new 92-ft., twin-screw, diesel powered, lighthouse tender for service in the coastal waters of Texas and Louisiana. The vessel will be of the Aster class and will cost about $125,000 complete.

Diesel Yacht Building in Seattle.—The Jensen Motorboat Corp., Seattle, Wash., has under construction an 80-ft. diesel cruiser for A. E. Griswold of Seattle. The craft was designed by Ralph W. Hugg, naval architect and marine engineer of Seattle, and embodies every feature for comfort and seaworthiness. She has a beam of 16 ft. and depth of 6 ft. and is to be powered by a 4-cylinder, 180-horsepower Johnson-Stroud diesel engine.

Bids on Motor Tug.—Bids were opened on June 23 at the U. S. Engineers Office, Room 710 Army Building, 39 Whitehall Street, New York, for the construction of a steel-hull, motor-driven tugboat for New York harbor work, to be 50 by 14 by 7 ft. 3¾ in. and powered by a 135-horsepower diesel engine.

Hoover's Electric Machinery Has Satisfactory Trials. — The electric propulsion machinery on the Steamship President Hoover, first of two large passenger liners built for the Dollar Line, performed perfectly on the builders' trials held by the Newport News Shipbuilding Dry Dock Company from June 16 to 20 off Rockland, Maine. A maximum speed of 22.2 knots was reached, exceeding the guaranteed speed by 1.7 knots.

The electric equipment, furnished by the General Electric Company, includes two 13,500-horsepower turbines in the power plant, driving two generators with a total continuous rating of 20,200 kilowatts. The propeller shafts are driven by two 13,250-horsepower motors at 132 revolutions per minute.

Trials included various standardization speed runs over the measured mile course at Rockland, full speed reversal from full speed ahead, shifting the rudder from "hard over" to "hard over" at full speed, etc.

Navy to Test New Type Engine.—Bids on experimental types of heavy oil engines, from which it is hoped to find a satisfactory type of power plant for installation on cruisers as well as for perfection of existing types used on submarines were opened June 12 by the Navy Department. These were submitted by the Electric Boat Co., $67,500; McIntosh & Seymour Corp., $85,000; Washington Iron Works, $95,693; Winton Engine Corp., $96,250.

The specifications limited the weight to 22 pounds per horsepower, but required the engines to have 600 horsepower and an engine speed of 700 revolutions per minute. The Navy Department intends to reengine the oiler Maumee and to try out a new type of heavy oil power plant in a future submarine.

The Navy Department sought appropriations from the last session of Congress to carry on research and experimental work and to buy European engines for study in order to ascertain the most modern and reliable power plants for submarines and other naval vessels. The $3,000,000 requested for special experimental work was not appropriated by the last Congress.

Panama Mail Keel Laying. — On Friday, June 26 was held the keel laying of the first of the fine new passenger and freight liners for the Panama Mail Steamship Company and the Grace Lines, Inc., which are under construction by the Federal Shipbuilding & Drydock Company, Camden, New Jersey. The keel of the second vessel will be laid in August; and delivery date is set for September, 1932.

Two Ships to be Remodeled.—The Mississippi Shipping Company of New Orleans has had plans approved by the Shipping Board for the remodeling of the steamships Salvation Lass and Schoodic at an approximate cost of $410,000.

The improvements contemplated include the installation of passenger accommodations in preparation for the inauguration, early in August, of a regular passenger service between New Orleans and ports on the East Coast of South America; rebuilding of engines to increase the speed of the vessels from 10 to 13 knots.

N. O. Pedrick is general manager of the company. Engineering specifications were prepared by J. F. Paige, 17 Battery Place, New York, and passenger accommodations specifications by George G. Sharp, 30 Church Street, New York. Jahncke Dry Docks, Inc., New Orleans, is said to have been the low bidder for the work.

New Ferryboat Planned at Norfolk.—According to reports from the East Coast, the Norfolk County Ferries, Portsmouth, Virginia, of which Charles U. Freund is superintendent, is contemplating the building of a ferryboat similar to the City of Norfolk for operation between Norfolk and Berkeley. Mr. Freund has submitted to the Norfolk County Supervisors and the Portsmouth City Council tentative plans covering the construction of either one of two types of diesel-driven boats.

At right are shown two views at the launching of the two ferryboats Murray Hill and Washington Square for the New York Department of Plant & Structure by the Todd Shipyards Corp.'s Brooklyn Plant. At left, the Washington Square sliding down the ways. At right, Miss Evelyn Wagner, sponsor of the Murray Hill, Commissioner Albert E. Goldman of the New York Department of Plant and Structure, Senator Robert F. Wagner, and William H. Todd, president, Todd Shipyards Corporation.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of June 1, 1931

Pacific Coast

ALBINA ENGINE & MACHINE WORKS,
Portland, Oregon

Purchasing Agent: Jno. W. West

L. P. Hosford, hull 34, tunnel-stern, passenger and freight motorship for Harkins Transportation Co., Portland, Ore.: 160 L.B.P.; 30 beam; 15 mi. speed; Atlas-Imperial diesel eng.; keel 2/10/31; launched 5/13/31; deliver 6/15/31 est.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30, launched 4/2/31; deliver 7/15/31 est.

Samona II, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft; two 500 H.P. Winton diesel engs.; keel 3/15/31; launch 6/27/31 est.; delivery Aug./31 est.

GENERAL ENGINEERING & DRY DOCK CO
Oakland, Calif.

Purchasing Agent: A. Wanner.

W. M Wightman, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; **launched 6/18/31**; deliver 7/1/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; launch 7/27/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; launch 8/20/31 est.

PRINCE RUPERT DRYDOCK & SHIPYARD
Prince Rupert, B.C.

Purchasing Agent: H. L. Taylor.

Essington, hull 38, wooden stern-wheel river snagboat hull for Dept. of Public Works of Canada; 100 L.B.P.; 29 beam; engs. from old Bobolink; keel 12/8/30; launched 4/2/31; **delivered 5/14/31.**

Northern Cross, hull 39, raised deck wooden cruiser for Anglican Mission for northern British Columbia Coast; 47 L.B.P.; 12 beam; 8'6" molded depth; 9 knots loaded speed; high speed Gardner diesel engine, 2-1 reduction gear; 54 B.H.P.; keel 2/15/31; **delivered 5/30/31.**

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: stmrs. La Purisima, Thachee, Korrigan III, Tecumseh, Munami, Ranella, Peter Helms, Emidio, H. F. Alexander, San Jose, Admiral Halstead, Maunawili, Saramacca, Helen Whittier, Lake Galewood, m.s. Finnanger, Pegasus, launch Asama, bark Thos. P. Emigh, tug Pilot, Sea Scout, fireboat David Scannel, Dennis T. Sullivan, ferry Golden Bear, mud barge No. 8. Pipe repairs: Albion Star, Teiyo Maru. Calibrate pressure gauge, etc.: m.s. Cubore. Caulk rivets and seams: Dixie Arrow. Weld lug on winch cylinder: Emma Alexander. Overhaul telemotor gear, etc.: Dorothy Alexander. Misc. repairs: stmrs. Shabonee, Dorothy Alexander, Elizabeth Kellog, La Perla, Washington, Makura, Pennsylvania, Dio, West Ives, California, Delight, Suriname, m.s. Santa Clara Valley, Silverhazel, Lio.

ALBINA ENGINE & MACHINE WORKS, Portland, Oregon

General repairs to fireboat David Campbell.

THE MOORE DRY DOCK COMPANY, Oakland, Calif.

Drydock, clean, paint; Fort Armstrong (also overhaul steam turbine and other misc. repairs), schr. Beulah, gas schr. Golden State, schr. Galilee, schr. City of Papeete, dredge A. MacKenzie (also general overhaul), stmr. Golden Star, ferry Thoroughfare (also remove copper sheathing, caulk hull as directed, hull cemented, scraped and painted), stmr. Crockett (also misc. hull repairs), Hyades (also overhaul sea valves, repack stern gland), stmr. Admiral Schley (also overhaul sea valves, repack stern gland, caulk misc. rivets), stmr. West Mahwah (also overhaul sea valves, repack stern gland), Santiam (also misc. caulking and hull repairs), stmr. San Pedro (also repairs to damaged shell plating), stmr. Kentucky (also drew tail shaft, overhauled sea valves, rewooded stern bearing, caulked and renewed misc. rivets in shell and tank top), stmr. Golden West (also misc. engine repairs, caulk and renew misc. rivets in shell), stmr. Columbian (also overhauled sea valves), Virgil G. Bogue (also renewed rudder stock), Glacier (also drew tail shaft for examination, overhauled sea valves, misc. boiler repairs), stmr. Golden Rod (also drew tail shaft, rewooded stern bearings, misc. repairs to forepeak tank), stmr. Kentuckian (also misc. engine repairs, renewal and caulking of rivets in shell), stmr. Nevadan (also caulked, welded misc. rivets in shell and on tank top). Renew knuckle strake plates: Amer. Dredging Barges Nos. 5 and 6.

PRINCE RUPERT DRY DOCK & SHIPYARD, Prince Rupert, B.C.

Docked, cleaned, painted, damage repairs, including renewal of keel: yacht Rio Bonita. Dock, clean, paint, misc. hull and engine repairs: launch Alpinefir, also 16 fishing boats. Dock, clean, paint, annual overhaul, misc. repairs: Birnie. Misc. hull and engine repairs: 52 fishing boats.

U. S. NAVY YARD, Bremerton, Wash.

Misc. repairs and docking: Nevada, Oklahoma, Lea, Aaron Ward, Eagle boats Nos. 11, 32, 38, 57. Misc. repairs incident to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account. 175 x 26x11 ft.; 5 delivered July/30; **3 delivered 5/31.**

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **7 keels laid; 4 launched.**

AMERICAN SHIP BUILDING CO.
Cleveland, Ohio

Purchasing Agent: C. H. Hirsching.

Hull 808, dump scow for Great Lakes Dredge & Dock Co.; 223 L.B.P.; 42'4" beam; 15 depth; 1500 cu. yards cap.; **keel 1/1/31**; launched 3/31/31; **delivered 4/1/31.**

BATH IRON WORKS
Bath, Maine

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31.

Helene, Hull 140, twin-screw diesel yacht for Chas. E. Sorensen; 146 ft. length; keel 8/1/30; launched 4/18/31; **delivered 5/15/31.**

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30; launch 7/18/31 est.; deliver 8/10/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30; launched 4/30/31; deliver 6/2/31 est.

Halonia, hull 146, diesel-elec. yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.; keel 1/13/31; **launched 5/2/31; sea trials 6/6/31**; deliver 6/15/31 est.

Felicia, hull 145, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/30/31; launch 8/1/31 est.; deliver 8/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; **keel 5/1/31**; deliver 11/29/31 est.

Hull 148, same as above. **keel 5/6/31;** deliver 12/24/31 est.

Hull 149, same as above. **keel 5/9/31;** deliver 1/18/32 est.

Hull 150, same as above. **keel 5/14/31;** deliver 2/12/32 est.

Hull 151, same as above. **keel 5/20/31;** deliver 3/9/32 est.

Hull 152, same as above, keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, **for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.**

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 17,500 gross tons; launch 7/18/31 est.

Monterey, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4284, steel barges for Western Maryland Railway Co.; **launched 3/25/31.**

Hull 4285, same as above; **launched 4/15/31.**

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

Island Girl, all-welded steel ferryboat for the Seaboard Air Line; 65 x 22 ft., 120 H.P. Fairbanks-Morse eng.; keel 3/7/31; **launched 5/20/31.**

One all-welded steel yacht, owner not named; 50 x 13 ft.; diesel eng.; keel 11/30; deliver at Savannah 6/15/31 est.

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.

CONSOLIDATED SHIPBUILDING CORPORATION
Morris Heights, N. Y.

Hull 2994, 81-foot commuter boat, owner not named; 2 300-H.P. Speedway engines.

Hull 2996, 110-ft. cruiser for A. M. Dick; 3 300-H.P. Speedway diesels.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Rosewill II, hull 146, steel yacht, owner not named; 126 L.B.P.; 18 beam 6 loaded draft; 18 mi. speed; 120 D.W.T.; 900 I.H.P. diesel eng.; keel 11/15/30; launch 5/16/31 est.; deliver 5/20/31 est.

Ber[illegible] III, hull 147, steel yacht for A. S. Close, Toledo, 106 L.B.P.; 17'6" beam, 6 loaded draft, 14 M.P.H.; 98 D.W.T.; 300 I. H. P. diesel eng.; keel 11/25/30; launched 5/2/31, deliver 5/15/31 est.

Not named, hull 148, wood yacht, for S. L. Avery, Chicago; 91'6" L.B.P.; 15'9" beam; 4'6" loaded draft; 85 D.W.T.; 24 mi. per hour speed; 1000 I.H.P. diesel eng.; keel 4/1/31; launch 6/15/31 est.; deliver 7/1/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1056-1057, 10,000-barrel oil barges for stock.

Hull 1072, miscellaneous cargo barge for stock, 130x30x8'6".

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **18 delivered.**

Hulls 1116-1117, two barges for U. S. Eng. Office, Pittsburgh, Pa.; 100 x 26 x 7'3".

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hulls 1131-1132, two steel cargo box barges for stock, 120x30x8'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Oil Transfer No. 22, hull 119, steel harbor barge for Oil Transfer Corp.; 175x36x12'7-1/8"; keel 5/19/30; launched 4/3/31; **delivered 5/23/31.**

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers.

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 watertube boilers; keel 3/15/31; **launched 5/9/31;** deliver 6/15/31 est.

Hull 277, sister to above, keel 3/25/31; launch 5/16/31 est.; deliver 7/1/31 est.

Not named, hull 278, tug for Dunbar & Sullivan Dredging Co.; 90 L.B.P.; 24'6" beam; 13 loaded draft; 12 loaded speed; comp. steam eng. 750 I.H.P.; 1 14-ft. Scotch boiler; **keel 5/23/31;** launch 6/27/31 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; keel 2/9/31; launched 3/21/31; left yard 5/13/31; deliver 6/5/31 est.

Huckleberry Finn, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launch 7/15/31 est.; deliver 12/21/31 est.

One steel maneuver boat hull for U. S. Engineers Office, Cincinnati; complete with derrick; 75 x 24 x 4'6".

MANITOWOC SHIPBUILDING CORPORATION
Manitowoc, Wis.

Purchasing Agent, H. Meyer.

Harry B. Williams, hull 268, steel tug for Great Lakes Dredge & Dock Co.; 115 x 26 x 15 ft.; one Babcock & Wilcox boiler; 850 H.P. turbine with reduction gear; keel 1/12/31; launched 3/21/31; **delivered 6/3/31.**

Hull 270, deck scow for U. S. Engineers, Chicago; 56 x 20 x 4'8"; keel 2/12/31; launched 3/21/31; **delivered 4/10/31.**

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S. Engineering Office, New Orleans; 65'6"x17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

MIDLAND BARGE COMPANY
Midland, Pa.

Five barges for Inland Waterways, Corp., Washington, D.C.; 230 x 45 x 11 ft.; 4 **keels laid; launched.**

Three barges for U.S.A. Engineers, Mobile, Ala.; 100 x 24 x 7 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; **launched 3/5/31.**

Hull 249, same as above; keel 1/17/31; **launched 3/16/31.**

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; keel 3/12/31; **launched 6/3/31.**

Not named, hull 253, steamboat hull for Woods Lumber Co.; 110 L.B.P.; 26 beam; 4'8" depth; keel 5/25/31 est.; launch 6/20/31 est.

Hull 254, derrick hull for Woods Lumber Co.; 82 x 28 x 4 ft.; keel 5/5/31; **launched 6/5/31.**

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 6/22/31 est.; launch 7/25/31 est.

Hull 256, oil barge for stock; 140 L.B.P.; 26 beam; 8 depth; keel 6/15/31 est; launch 7/10/31 est.

Hull 257, same as above; keel 6/15/31 est.; launch 7/20/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 7/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Florida, hull 342, passenger steamer for Peninsular & Occidental S.S. Co.;

386'6" L.O.A.; 56'6" beam; 26'6" depth; geared turbine drive; 19½ knots speed; keel 9/2/30; launched 3/7/31; **delivered 5/20/31.**

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement, turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 8/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launch 8/31 est.; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 12/31 est.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/31 est.; deliver 5/32 est.

Not named, hull 351, sister to above; keel 9/31 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Exeter, hull 396, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 8/11/30; launched 4/4/31; **delivered 6/1/31.**

Excambion, hull 397, sister to above; keel 10/25/30; **launched 5/28/31.**

Indianapolis, hull 399, light cruiser No 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers; keel 10/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Avalon, hull 1047, twin screw diesel yacht for Ogden L. Mills, New York; 175'5" L.O.A.; 24 beam; 13'6" molded depth; two 600 B.H.P. diesel engs.; keel 8/28/30; launched 3/14/31; **completed 5/30/31.**

Richmond, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; keel 2/12/31; launched 5/5/31; deliver 6/17/31.

Not named, hull 1053, steel hull and steel superstructure for auto carrying ferryboat for Wilson Line, Inc., Wilmington, Del.; 174'7" L.B.P.; 58 beam; 9'3" loaded draft; diesel machinery and other work by owners.

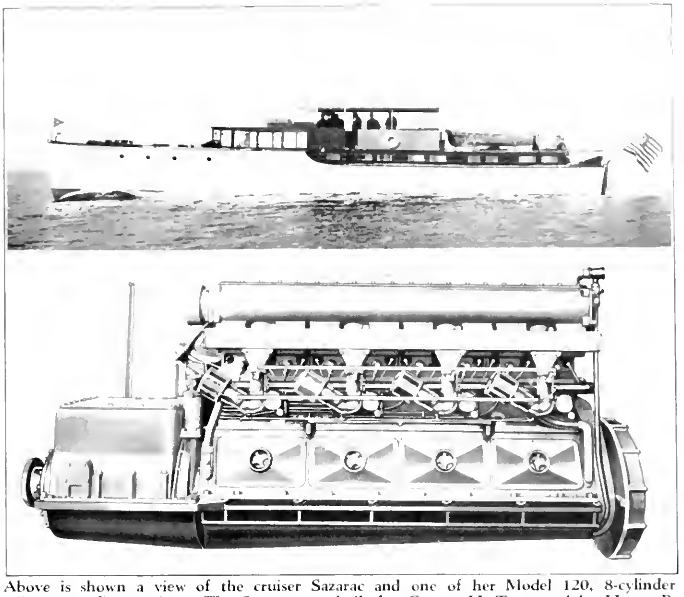
Repairs: City of Washington, hull 1052, rebuilding from main deck up. To have three decks above main deck and restored to original condition. (Damaged by fire). Wilson Line, Inc.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Kennedy, hull 270, diesel tug for Atlantic, Gulf & Pacific Co., New York; 35 L.B.P.; 11'7" beam; 4'1" loaded draft; 75 B.H.P. Fairbanks-Morse diesel eng.; keel 4/1/31; launched 5/6/31; **delivered 5/29/31.**

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor.



Above is shown a view of the cruiser Sazarac and one of her Model 120, 8-cylinder Winton gasoline engines. The Sazarac was built for George H. Townsend by Henry B. Nevins, Inc., City Island, N. Y., to designs by John H. Wells of New York. The craft made a speed of 27.08 miles an hour on her trials. She is 81 ft. 6 in. length over-all; 13 ft. 6 in. beam; 4 ft. draft. The Sazarac is a combination commuter and cruiser and has ample accommodations for extensive trips. Her two Winton engines develop 500 horsepower each at 1300 revolutions per minute.

SUN SHIPBUILDING COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; launch 7/13/31 est.; deliver 8/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 137, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 11/13/30; launch 5/16/31 est.; deliver 6/1/31 est.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 6/1/31 est., deliver 6/15/31 est.

Hull 139, steel oil-tank towing barge for Standard Transp. Co.; 225 x 38 x 10 ft.; keel 3/30/31; deliver 6/25/31 est.

Hull 140, sister to above; keel 4/2/31; deliver 6/25/31 est.

Hulls 141-145 incl., five small barges for Sun Oil Co.; 70 x 19 ft.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Murray Hill, hull 50, stem ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan./31; **launched 5/27/31.**

Washington Square, hull 51, sister to above; keel Jan./31; **launched 5/27/31.**

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel Jan./31.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; **launched 6/1/31;** deliver 10/1/31 est.

A. G. & P. Co. No. 10, truss-welded barge for Atlantic Gulf & Pacific Co.; 60 L.B.P.; 20 beam; 6 depth; **keel 5/7/31;** launch and deliver 6/20/31 est.

A. G. & P. Co. No. 11, sister to above; **keel 5/7/31;** launch and deliver 6/27/31 est.

U. S. NAVY YARD,
New York, N.Y.

New Orleans, light cruiser CL-32, for U.S. Navy; 10,000 tons displacement; deliver 12/1/32 est.

U. S. NAVY YARD,
Philadelphia, Pa.

Minneapolis, light cruiser CL-36, for U. S. Navy; 10,000 tons displacement; deliver 9/1/33 est.

U. S. NAVY YARD,
Portsmouth, Va.

V-5, submarine SC-1 for U. S. Navy; deliver 6/1/30 est.

Finest Transportation Offices on the Pacific Coast

GENERAL headquarters for the Pacific Coast passenger and freight business of the Panama Pacific Line are now located in the Monadnock building, 687 Market Street, San Francisco.

The Pacific Steamship Company has in the past acted as freight agent on the Pacific Coast for the Panama Pacific Line, but this arrangement has been terminated and the company has set up its own freight traffic department.

This department, as well as the passenger traffic department of the company, are now located in the Monadnock building, where office quarters have been fitted up in a manner that make them the equal of anything of the kind on the Coast. Carefully chosen United States rubber tiling on the floors of the aisles and the use of Armstrong linoleum for floor covering in the office spaces add greatly to the attractiveness of the interior.

The new line-up of the Pacific Coast organization of the Panama Pacific Line is as follows:

W. H. Hoskier, Pacific Coast manager.

L. E. Archer, passenger traffic manager.

A. G. Albertson, general passenger agent.

The freight traffic organization is headed by R. J. Ringwood, with C. H. Hurst as general freight agent here; Hugh Middelton, assistant general freight agent, Grove Street Terminal, Oakland; H. G. Adam, assistant general freight agent, 548 South Spring Street, Los Angeles; W. K. Sempey, assistant general freight agent, Municipal Pier, San Diego; W. H. Holmes, assistant general freight agent, McCormick Line Terminal, Portland; and John Mahoney, assistant general freight agent, Pier 6, Seattle.

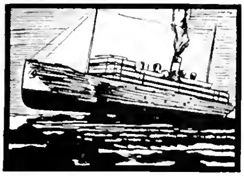
Captain Kirkwood Donavin, operating manager for the company, makes his headquarters at Pier 39, San Francisco, the company's new terminal at this port, as will also A. C. Jenkins, the line's claim agent.

Book Review

STEAM TURBINES. By T. M. Naylor. 207 pages, 5 x 8, with 171 illustrations; bound in blue cloth with gold stampings; published by The Norman W. Henley Publishing Co., New York. Price $4.50 net.

This book was written in 1929 to provide an up-to-date text book for engineering students in universities and technical schools. T. M. Naylor is an engineer lieutenant-commander in the British Royal Navy and a lecturer in Mechanical Engineering at the University of Leeds, England. His book purposely and wisely omits the usual chapters on the theory of thermodynamics, the properties of steam, and the theory of lubrication. He is therefore able to present all the essential points on turbine design and construction in a comparatively brief treatment.

Interior view of the new Pacific Coast headquarters of the Panama Pacific Line at San Francisco. At right is shown a view of the passenger booking parlor.



Marine Insurance

Edited by James A. Quinby

Aviation Insurance

A Comparison of Aircraft and Marine Coverage

WITH the world-wide increase of interest and development in aviation has naturally come a need for adequate insurance of aircraft. While the fire and casualty phases of aircraft underwriting have little or no similarity to maritime risks, insurance of an airplane while in flight against perils of the air more nearly approaches marine insurance than any other medium. The plane is to all intents and purposes a ship, with its navigator, crew, passengers, and in some cases freight. For this reason some interesting observations may be made as to the historical development of the two fields of underwriting.

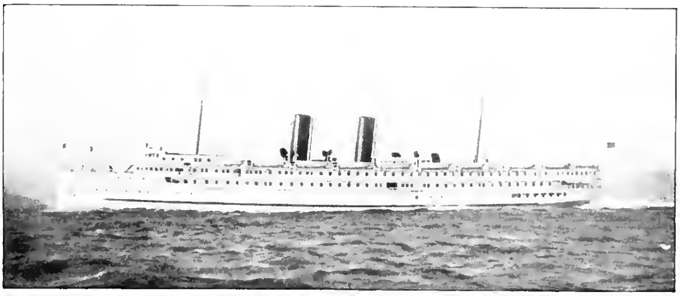
We are indebted to United States Aviation Underwriters, 80 John Street, New York, for the following list of classes of insurance available through that organization:

A. On aircraft

1. Hull insurance covering such of the following perils as may be agreed.
   While not in flight:
   (a) Fire, lightning, explosion (including transportation).
   (b) Windstorm, land damage, mooring, hail, and theft.
   While in flight:
   (a) Perils of the air (i.e., crash or accidental damage), including fire, lightning, explosion, and hail.
2. Liability Insurance covering aircraft owner's legal liability to such of the following as may be agreed:
   (a) Injuries to or death of public.
   (b) Injuries to or death of passengers.
   (c) Damage to property of others.

B. On personnel and individuals

1. Workmen's compensation and employers' legal liability covering flying and nonflying personnel of:
   (a) Air lines, flying services, aviation schools, aircraft and engine manufacturers, airport owners and operators, and aviation accessory concerns who own and operate aircraft.



S.S. HARVARD

Born, 1906, at Chester . . . . Died, 1931, at Point Arguello

Disconsolate, the YALE broods at her berth and seems to know
    The unbelieving sadness of your friends. So long
Were you a courtly, gracious comrade of our sunlit days,
    We scarce can credit now that dancing feet
No more may tread your polished deck. It is
    As if the sun had failed to rise. We look
Half hoping yet to see, at four o'clock,
    Your trim and yacht-like form speed out the Gate.

J.A.Q.

(b) Aviation employees of corporations or individuals not specified under section (a), but who operate aircraft for pleasure or in the conduct of their business.

2. Personal accident insurance covering death, dismemberment (also indemnities as may be agreed) in respect to:
   (a) Qualified pilots and copilots, radio operators, flying mechanics, stewards, etc.
   (b) Student pilots under instruction.
   (c) Passengers.

C. Airports and hangars

1. Airport owners' and operators' liability covering their legal liability for injuries to or death of public and for damage to property of others as provided under customary O.L.T. policy, but including flying hazard.
2. Airmeet liability covering legal liability of airmeet operators for death of or injuries to public and damage to property of others caused by a participating aircraft.
3. Hangar owners' liability covering their legal liability for loss or damage to aircraft in their custody which is the property of others, due to fire or other perils agreed upon.

D. Cargo, Cargo Liability, and Passenger Baggage Liability

1. Cargo covering approved merchandise against loss or damage from agreed upon perils for air voyages for account of merchandise owners.
2. Cargo liability covering the liability of the aircraft owner to shippers for loss or damage to merchandise for which the air line may be legally liable.
3. Passenger baggage liability covering aircraft owners' legal liability for loss or damage of passengers' baggage.

If we may imagine a similar outline put forth by a marine insurance group, it might read something like this:

A. On hull

1. While tied up in port:
   (a) Fire.
   (b) Port risks.
2. While at sea:
   (a) Perils of the sea, including fire, stranding, collision damage, etc.
   (b) Collision liability.

B. On owner's liability

1. Protection and indemnity insurance, covering the ship's liability for injury to persons or damage to cargo or other property, exclusive of other vessels.

C. On cargo, baggage, etc.

1. Cargo insurance, covering the cargo owner against certain specified perils, including perils of the sea.

From the above comparison, it may be readily seen that the air-borne or sea-borne risks are the most important in their respective fields. Due to the comparatively experimental nature of aircraft development, the specific warranties embodied in an application for air insurance are far more severe than warranties customarily found in a marine policy. We note, however, that a warranty of the legality of the venture is common to both forms of policy. In addition, the aircraft coverage is usually suspended when the plane is:

(a)—Operated by a person other than a pilot named in the declaration;

(b)—Used for instructional flying;

(c)—Transporting explosives;

(d)—Engaged in acrobatic flying, stunting, or racing;

(e)—Flying at night;

(f)—Being solely a land plane, flying over the sea (or solely a sea plane, flying over land);

(g)—Operated while the Department of Commerce license is revoked or suspended.

In the last provision above cited, we note a similarity to marine hull underwriters' requirements that a vessel shall be classified annually, or after accidents, in a named bureau. There is no warranty of seaworthiness in a marine hull time policy, however, and we gather that there is no warranty of airworthiness in an aviation policy, unless the Department of Commerce has already condemned the plane.

The Human Element

As the ratio of loss to flying craft while in the air is directly dependent upon the ability and experience of the pilot, it is not surprising to find that the rate of premium for coverage against air perils varies greatly with the individual pilot. In this particular, marine underwriters could well take a lesson from their newer brothers of the air.

Of course, it would be difficult for the navigating officer of the Malolo or the Virginia to take the vessel into an outside loop or a tail-spin, but the tragedies and near-tragedies of the Pacific Coast have not as a general rule been due to storms or uncharted rocks. They have been due to the failure of the human element. Witness the Lyman Stewart, the San Juan, and, more recently, the Harvard. The aircraft underwriter takes a personal interest in his pilot, and bases his rate of premium upon the pilot's experience and standing. The marine underwriter covers a vessel whose value may well exceed that of a whole squadron of aircraft, and yet the ocean insurance fraternity has as yet perfected no rating system for navigation.

Of course, vessels above a certain size must be in charge of licensed officers, but this does not mean that licensed officers are equal in ability. Aircraft must be piloted by licensed men, but this fact has not prevented aviation underwriters from establishing an individual experience rating system.

Title Basis of Insurable Interest

OF unique interest to the cargo owner and underwriter is the recent case of the Harlem, 1931 A.M.C. 911, in which the Circuit Court of Appeals of the Second Circuit reverses a District Court decision reported at 1930 A.M.C. 1532.

Perryman-Burns Coal Company made an oral contract with Nelson Bros. Coal Company, confirmed by a written memorandum, providing for the sale by the fomer to the latter of 400 tons coal, f.o.b. the buyer's barge Harlem at the Erie Railroad piers. The seller was to take out marine insurance for account of the buyer. The coal was duly loaded on the barge, which thereafter proceeded to sink. The cost of salvaging the coal was claimed by the seller under the marine policy, in an action in the New York Supreme Court. The court held that there could be no recovery under the policy, first because the seller had no insurable interest, title having passed to the buyer, and, second, because the sinking was due to unseaworthiness rather than to perils of the sea. Apparently the policy did not admit seaworthiness as between the assured and insurer, or the court overlooked this customary admission.

In spite of the fact that the seller (Perryman-Burns Co.) had made certain admissions of ownership the court, in the following language, found that they were not the actual owners at the time of the loss:

"In general, where a sale is made f.o.b. the point of shipment, title passes to the seller upon delivery to the carrier and the goods sold are at the buyer's risk, United States vs. Andrews, 207 U.S: 229; Standard Casing Co. vs. California Casing Co., 233 N. Y. 413; Rosenberg Bros. Co. vs. Buffum Co., 234 N. Y. 338. This rule would seem to apply with special strength where the coal was loaded into a barge belonging to the purchaser. In the present case the buyer was to pay both freight and insurance as well as trimming and other expenses at Undercliff. A right to inspect and reject the coal if it did not meet contract requirements would not prevent the passage of title.

In Louisville & Nashville R. R. vs. United States, 267 U. S. 395, where the United States reserved the right to test coal after transportation and reject it if it did not come up to specification, it was held that such a right "was not inconsistent with transfer of title . . . at the time of delivery of the coal on cars at the mines", Delaware, Lackawanna & Western R. R. vs. United States, 231 U. S. 363; Illinois Central R. R. vs. United States, 265 U. S. 209.

The libellant makes the further point that because the barge was sunk near the coal yards of the buyer and had not been towed to its final destination at the buyer's dock there was a failure on the part of the seller to complete its towing contract and the title had not passed. But if the seller, by neglecting to bring the barge up to the dock, failed in a slight degree to complete the carriage of the coal, that circumstance had nothing to do with the passage of title in a case of this kind.

In Louisville & Nashville R. R. vs. United States, 267 U. S., at p. 400, though the seller had contracted to transfer the coal from the railroad cars to barges it was held that the title passed when the coal was placed on the cars.

We think that the statements by Perryman-Burns Coal Co., Inc., which were made in connection with the former litigation were no more than matters of opinion and that it was clearly under a misapprehension as to when as a matter of law the title to the coal passed. While the statements may have had some prima facie significance in favor of the libellant, they are far outweighed by the other circumstances which show that the title to the coal passed to libellant when it was loaded on its barge at Undercliff Piers. It surely can have no claim to a contribution in general average based on expenditures in respect to its own coal and barge."

Those Andree Cases

TWO interesting and somewhat revolutionary cases, one in England and one in the United States, have recently been decided in connection with general averages arising on a single voyage of the British steamer Andree.

A fire broke out in the holds of the vessel while loading in New York in April, 1922, which entailed certain general average expenditures. She reloaded

and sailed, and on May 22 she collided with the H. F. Alexander and sank near Philadelphia. The cargo was salved and the vessel raised and taken to Chester, where the voyage was abandoned. General average expenditures were also undertaken by the shipowners as a result of the collision.

By the law and practice prevailing at Philadelphia, owners of property were not liable in general average for more than the salved value of the property. The shipowner's general average expense at New York was $63,000, and the only cargo available to pay it was that cargo landed at New York after the first general average. Such landed cargo had a value of only $18,000, so the ship was out of pocket some $45,000, since by Rule 17 of the York-Antwerp Rules of 1890, the expenditure for the second general average had to be deducted from the values of ship and cargo for the purposes of the first general average. After making such deduction, value of the ship and the rest of the cargo were nil. By reason of deficiency in salved values on the second general average, the ship owners were out of pocket a further sum of $150,000. The ship's contribution to this loss could, of course, be collected from her hull underwriters, but the cargo's proportion was not forthcoming from cargo, due to the elimination of cargo value. In this dilemma, the shipowners, in a British court, sued their hull underwriters and P. & I. underwriters, alleging either (a) that the former were liable since the arbitrary elimination of cargo as a contributing interest automatically raised the contribution due from hull, or (b) that the latter were liable as for cargo's proportion of general average not otherwise recoverable.

Justice Roche of the King's Bench Division held that the hull underwriters were liable, basing his decision upon the necessity of using values existing at the close of the adventure.

"It seems to me," said the court, "to be unnatural, if not impossible, to adopt an act upon values estimated or assessed at two different dates—the termination of the adventure and the incurring of the expenditure. The intention of an insurance contract in the present form seems to me to be that, as regards general average, the contract of affreightment and the contract of insurance shall proceed upon the same basic principles.

"Accordingly, if a shipowner, being the assured under a policy in the present form, incurs expenditure for general average and the cargo's contribution falls short of what is hoped or expressed by reason of the limitation of extinction of its value before the adventure ends, then I think that loss falls into the category of the proportion of the loss which falls upon the assured shipowner, and is within the meaning of the words in the Marine Insurance Act, section 66, subsection 4. I therefore hold that the plaintiffs are entitled to recover the balance of their claim against the hull underwriters"

The American Decision

Shortly before the decision in the above mentioned English case, the Circuit Court of Appeals of the Second Circuit handed down a ruling reported as The Andree, 1931 A M C 634, reversing the lower court's earlier finding set forth at 1930 A.M.C. 1233. The American case does not concern recoveries from alternate insurers, but deals with the cargo's right to recover general average allowances when the vessel is lost subsequent to the general average act.

In the fire at New York, much cargo was damaged by water used in extinguishing the blaze. If the voyage had been completed, the cargo owners would have been entitled to a contribution from the shipowners of about $27,000. But the voyage was not completed. The ship was in collision at Philadelphia, and was sunk. The expense of raising her was in excess of her value when raised.

After the New York general average, and prior to the Philadelphia collision, the cargo had a lien upon the ship for the cargo allowances, or for the balance due cargo as based upon such allowances. After the collision, the cargo endeavored to collect such balance out of the shipowner's collision recovery, but the District Court ruled that the lien died with the ship. Upon the present appeal, the upper court reverses the original ruling and holds that the general average lien for benefit of sacrificed cargo attaches to sums received by the vessel owner as collision damages, in the proportion that the damages recovered bears to the property loss.

The bills of lading provided for the York-Antwerp Rules, Rule 17 of which reads "the contribution to a general average shall be made upon the actual value of the property at the termination of the adventure . . . . ."

The shipowner contended that the words "actual values of the property" precluded any consideration of the collision recovery, but the court answered this contention in the following language:

"In equity and good conscience this lien should be paid. If the Andree had made the voyage, at the end thereof it would have had to pay the lien; and having obtained sustantially the full value of the vessel to which the lien attached, may the owners retain that sum without paying the lien? We think not . . . . Because of the collision damages awarded, the Andree has not been lost, and the sum paid as a recovery for collision damages is the res to which the lien arising by reason of the sacrifice made in New York attaches."

While the two Andree decisions are not contrary holdings on identical points, they are to a certain extent opposed in theory, and we are unpatriotic enough to favor the British case, which is certainly based upon a straightforward and common-sense interpretation of York Antwerp Rule 17. It is all very well to speak of equity, but there should be no equity in favor of a lienor who has subscribed to a written document providing for a definite manner of adjustment.

Rule 17 mentions "actual values of the property at the termination of the adventure." It is difficult to conceive of a stronger way of indicating tangible, concrete values. General average has always ignored the intangible things, such as expected profits. To allow this strained interpretation of simple language is to open the door to all sorts of abuses. The adjuster may be forced to consider profits, insurance recoveries, charter earnings, and other intangible and hypothetical values which will tend to complicate the already devious institution of general average. A definite pronouncement of the point will soon be made by our highest tribunal, for certiorari has been granted by the Supreme Court.

Freights, Charters, Sales

June 15, 1931.

THE following steamers have been fixed with grain to U.K./Cont.: A steamer, Portland or Puget Sound to U.K. Cont., 23 9, option barley from San Francisco, July, Strauss & Co.; Danish m.s. Stjerneborg, British Columbia to U.K./Cont., $1.10, prompt, Canadian American Shipping Co.; British str. Mabriton, Vancouver, B.C., to London, berthed, June, Dale & Co.

The following steamers have been fixed with lumber to the Orient: British m.s. Cape Horn, Grays Harbor to Japan, June, Canadian American Shipping Co.; British str. Melmay, British Columbia to Japan, June, Canadian American Shipping Co.; Japanese str. Toyokawa Maru, Grays Harbor and Willapa Harbor to Osaka and Shimidzu, prompt, Allen Shipping Co.

The following steamers have been fixed with lumber to the Atlantic: American m.s. Lake Osweya, North Pacific to North of Hatteras, June, Hirsch Lumber Co.; American str. Onondaga, Columbia River and Coos Bay to New York, July, Henry D. Davis Lumber Co.

The Danish str. Lundby has been fixed with lumber from British Columbia to Port Pirie (relet) by H. R. MacMillan Export Co.

The following time charters have been reported: Norwegian m.s. Elg, 1 trip, delivery North Hatteras, redelivery U.K. Cont. via North Pacific, $1.05, May/June; Danish str. Lundby, Pacific Trade, delivery British Columbia redelivery Australia, July, Canadian Trading Co.

The American barkentine Conqueror has been sold by Hind, Rolph & Co. to Captain James A. Hersey.

PAGE BROTHERS, Brokers.

Trade Notes

Packing Sales Organization.—The Rhodes Metallic Packing Company at Detroit, Michigan, has recently published a booklet describing its patented resilient lubricated metallic packing which is especially valuable for all conditions of service where temperatures do not exceed 500 degrees Fahrenheit. In marine use, this packing has proved eminently satisfactory in pumps for various services, such as boiler feed, condensate, ammonia brine, bilge water, and circulating water, fuel oil. It is also in very successful use in valve stuffing boxes and for piston rods, valves, and stems in reciprocating engines, on air compressors and ammonia and carbon dioxide compressors.

L. R. Parker of Los Angeles is general representative for California for the Rhodes Metallic Packing Company. He has appointed the Marine Engineering & Supply Co. of Wilmington as marine sales representative for southern California and the C. E. Rhodes Co. of San Francisco as marine sales representatives for northern California. The representative for the Pacific Northwest will be appointed in the near future.

New Sales Executive.—At a recent meeting of the board of directors of the McIntosh & Seymour Corporation, John Thomas was appointed Vice-President in Charge of Sales. Mr. Thomas is a native of Alabama, a graduate engineer, and

John Thomas, Vice-President in Charge of Sales, McIntosh & Seymour Corporation.

was for ten years with General Electric Company during the latter part of which period he was in charge of the Marine Section. He became General Sales Manager of McIntosh & Seymour Corporation in October, 1930.

I. M. M. Annual Meeting. — At the annual meeting of the International Mercantile Marine Company, held at the principal office of the company, 51 Newark Street, Hoboken, New Jersey, on June 1, two new directors were elected for the coming year, John M. Perry and H. G. Philips, who is treasurer of the company. The other members of the board of directors of the company are Vincent Astor, Harry Bronner, P. A. S. Franklin, John M. Franklin, John W. Hanes, Basil Harris, J. P. Morgan, John W. Platten, Kermit Roosevelt, Charles H. Sabin, Frederick W. Scott, Charles Steele, Charles A. Stone, and Elisha Walker.

The earnings of the American companies for 1930 amounted to $1,252,284.95 or approximately $2 a share which compares with $2,423,350.09 or approximately $4 per share for the year 1929.

Rubber Bearings in Service. — Cutless rubber bearings manufactured by The B. F. Goodrich Rubber Company played an important part in the recent record run from New Orleans to St. Louis of the motor boat Greyhound, built by Higgins Industries, Inc., New Orleans. "Everything perfect." A. J. Higgins, president of the boat company, wired the Goodrich company after examining the bearings and the Monel metal shaft following the treacherous 72-hour run of the 23-foot sport cruiser.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

Herbert J. Anderson, winner of the Third Annual San Francisco Steamship Golf Tournament.

San Francisco Steamship Golf Tournament Great Success

THE shipping offices of San Francisco were noticeably quiet on June 9 while important business of playing off the Third Annual Steamship Golf Tournament had to be attended to on the Olympic Club's ocean course at Lakeside. It was not possible to round up all the participants for photographic alibis, but we managed to "shoot" a few. The perpetual cup this year was won by Herbert (Bert) J. Anderson, in Class A, with a card of 89-17-72. Arnold Foster in Class B showed a card of 92-20-72, but lost out on the shake.

Following are the winners of the various classes:

Low Net H J Anderson	89	17	72
Low Gross Thos. E Cutte	81		
Low Net Class "A" (Hdks. of 19 and under) Howard Hays	82	9	73
Runner Up, Low Net, Class "A" Wm. C. Empey	86	13	73
Low Net Class "B" (Hdks. of 20 and over) Arnold Foster	92	20	72
Runner Up Low Net Class "B" George Zeh	95	22	73
Guest Flight			
Won by Geo. J Presley	88	14	74
Runner Up Wm Wickersham	90	16	74

At right, from port to starb'd: Dr. R. F. Tomlinson, Glenn T. Hoffman, Harvey Huff, Zac T. George, Monte Wright, William Denman, Phil Coxon, George Zeh, C. C. Mallory, and Ralph G. Sullivan. This hardy crew are at the first tee of the Ocean Course, Lakeside, San Francisco.

Here we have more marine mashie manipulators. This gathering includes R. W. Slingerland, W. J. Edwards, James Eschen, William Empey, John Parker, Ernest L. McCormick, Frank Fox, James H. Young, and Millard Hickman.

John T. Greany and A. S. Gunn finished up even at the 18th

Sixty-eight Shipping Men Take "Pencil Test"

CLASS "A"

	Gross	Hdk	Net
H J Anderson	89	17	72
H C Hays	82	9	73
W C Empey	86	13	73
Thos E Cutte	81	7	74
Oliver J Olson	86	12	74
Geo A Armes	92	17	75
John Parker	97	19	76
Geo B Schirmer	85	8	77
Thos B Crowley	93	16	77
W J Gray, Jr	95	18	77
J Botts	96	18	78
Sid Livingston	89	10	79
H M Huff	94	14	80
Jos McKeon	96	16	80
James Foran	91	10	81
Ira S Lillick	99	16	83
A. T Gibson	101	18	83
J C Strittmatter	98	14	84
Paul Faulkner	102	18	84
C L Moody	100	16	84
Hugh Gallagher	103	17	86
John T Greany	105	19	86
R C Sullivan	104	16	88
Zac T George	109	19	90
James H Young	No returns		

CLASS "B"

	Gross	Hdk.	Net
Arnold Foster	92	20	72
George D Zeh	95	22	73
W J Mahoney	97	22	75
R. O Houghton	101	26	75
M C. Darr	102	27	75
George J Yater	98	22	76
John C. Rohlfs	97	22	77
S J Sherwood	97	20	77
F. J. O'Connor	100	23	77
Ed B Egbert	99	20	79
W. J Edwards	104	24	80
W. T. Hunter	106	26	80
Ernest L. McCormick	105	23	82
F. C. Kobely	104	20	84
J. H Farmer	112	27	85
Dave Young	106	20	86
A S Gunn	108	22	86
H T Haviside	112	26	86
J Eschen	109	22	87
M J Wright	115	26	89
J Walter Kell.	116	27	89
J A Peggs	120	27	93
L E Archer	121	27	94
James P Cribbin	126	27	101
Frank H De Pue, Jr	125	27	102
Glenn T Hoffman	140	27	113
Phil A Coxon	No returns		
Wm Denman	No returns		
M R Hickman	No returns		
C. C Mallory	No returns		
Frank H Fox	No returns		

GUEST FLIGHT

	Gross	Hdk	Net
Geo J Presley	88	14	74
Wm Wickersham	90	16	74
J E Lowden	92	17	75
W. Edgar Martin	103	26	77
H B. Mills	87	9	78
Dr R F Tomlinson	97	18	79
Albert B Hood	99	18	81
J McDonald	108	27	81
H Kellenbeck	109	25	84
C M LeCount	107	18	89
R N Slingerland	147	27	120

The marine fraternity of Los Angeles harbor and many of their friends from San Diego and as far north as San Francisco gathered at the Royal Palms, June 20, to settle for the second time the annual question as to who digs the deepest divots. The tournament was held under the auspices of the Bilge Club W. H. WICKERSHAM was general chairman and H. E. PICKERING was secretary. BURT EDWARDS headed the general arrangements committee; E. R. BRUCKER and R. S. SNODGRASS took care of preparations for the Barbecue and entertainment of the nongolfers; GEO. NICHOLSON

Happy smiles were the rule of the day. Above are shown: John C. Rohlfs lining up his approach; Hugh Gallagher and Arnold Foster waiting their turn to "shoot;" Frank O'Connor "follows thru."

▼

High and low handicaps in this sextet. William Empey, Ed Egbert, Byron Haviside, Howard Hays, Paul Faulkner, and George Schirmer.

headed the handicaps committee and JAMES H. DODSON, JR., arranged the schedule of players.

As we go to press we learn the coveted perpetual cup presented for the Bilge Club tournaments by Bethlehem Shipbuilding Corporation, was won by GEO. A. ARMES of San Francisco, who is president and manager of the Los Angeles Shipbuilding & Drydock Corporation of San Pedro and the General Engineering & Drydock Company of Oakland. His low net score was 71, with handicap of 15.

Low gross score was turned in by GEORGE BANKSON, general manager of Marine Terminals Corporation at San Pedro.

J. C. McQUISTON, general advertising manager of the Westinghouse Electric and Manufacturing Company, has announced his retirement effective June 1, 1931.

Gifted with a most pleasing and dynamic personality, and combining the abilities of analyst, speaker, and writer, Mr. McQuiston is probably the best known advertising executive in America. In his decision to retire from Westinghouse he brings to an end a record of continuous advertising administration for one company unparalleled in American industry. For twenty-nine years Mr. McQuiston has been in charge of advertising for Westinghouse, during which time the status of advertising and sales promotion, distribution and other allied phases of his profession have gone through as many changes as the electrical industry itself. As president of the Association of National Advertisers and as a leader in associational work in the electrical and allied industries he is perhaps better known personally to more members of the electrical world than any other man within it.

CAPTAIN JAMES E. ROBERTS of the Panama Pacific liner Virginia was honored by the presentation of a handsome testimonial by the Fred Olsen Line at San Francisco June 19 in recognition of his promptness, seamanship, and humanitarianism in turning back on his course at sea and forcing his ship at top speed 130 miles to render aid to a sick man on the motorship Benjamin Franklin of Oslo. The gift is in the form of a Viking ship in silver on a bronze base, and the presentation was made in the Panama-Pacific offices at Pier 39 by F. W. KUTTER, Pacific Coast manager for the Fred Olsen Line. The man whose life was saved by the prompt action of Captain Roberts is NILS OLSEN, a refrigerating engineer. The deed was performed October 11 last.

After twenty-nine years in advertising and sales promotion work for Westinghouse, during which time almost phenomenal progress has been made in electrical achievements, J. C. McQuiston has decided to retire.

Charles A. Winslow, recently of the Hercules Motor Corp., Canton, Ohio, has been elected vice-president and general manager of the Standard Gas Engine Co. of Oakland, California. Winslow supersedes E. H. Thresh.

John Thysse, shown above, is chief engineer of the Standard Gas Engine Company of Oakland, California.

CHARLES LONG, who has been traveling passenger agent for the United States Lines, with headquarters at San Francisco, has been promoted to district passenger agent of the company with headquarters in Seattle, succeeding Harry Brandt.

The appointment has been announced of MYRON (JEFF) HOLZER, veteran purser of the Dollar Steamship Lines, to the post of purser of the company's new de luxe liner President Hoover. The announcement was by R. STANLEY DOLLAR. Holzer has followed the sea for the past 22 years, starting his career in 1909 as freight clerk on the steamer City of Topeka of the Pacific Coast Steamship Company. In 1914 he was made a purser and since then has served in that capacity on coastwise and transpacific liners. Prior to his appointment to the President Hoover he had been serving on the President Jackson. Purser Holzer went East in time for the trial trip of the new vessel.

GAILLARD F. RAVENEL, who has been general manager for the International Mercantile Marine Company at Boston for the past twelve years, has been appointed to the post of vice-president and manager of the Baltimore office of the New Baltimore Mail Steamship Line. Mr. Ravenel will be remembered as the man who was sent to the Pacific Coast this spring to make arrangements for the transfer of the freight department of the Panama Pacific Line from the Pacific Steamship Company to the company's own offices and the establishment of new headquarters in the leading Pacific Coast Ports.

ELGIN STODDARD, well known engineer of San Francisco, has been elected president of C. C. Moore & Co. of San Francisco, according to an announcement sent out recently by CHAS. C. MOORE, chairman of the board. Mr. Stoddard is to be congratulated on this well merited promotion and his friends wish him a long and successful career.

Official News *of the* PROPELLER CLUB *of* California

The many angles to the industry which is classed under the head of "Shipping" are brought prominently to attention when one surveys a list of the topics which are covered in the weekly luncheon meetings of The Propeller Club of California at its Tuesday noon-time gatherings at the Commercial Club at San Francisco. We list herewith some of the recent talks and a few notes on future activities of the club:

May 19. Captain Julius Lauterbach von Emden, navigator of the German battleship EMDEN and later commander of the German raider MOEWE gave us a very interesting talk on "The German Navy in action during the World War."

May 26. Through the courtesy of Hugh Brown a very fine moving picture was shown entitled "Field Construction of the longest gas pipe in the world".

June 2. James Quinby, admiralty attorney, addressed us on the subject "Marine Insurance"—very interesting.

June 9. Everybody is interested in the economies of Station "A", the new high economy plant of the Pacific Gas & Electric Co. George Barr of the General Electric Co. gave us a very complete description of the equipment installed in this plant.

June 16. C. F. Gross, Professor of Naval Architecture and Marine Engineering at the University of California, gave us a very interesting talk on the subject "The place of education in the shipping industry."

June 23. Phil Williams, chemical engineer of the Standard Oil Company (Calif.) explained in detail and showed pictures of the flue gas system which his company has developed and installed on their vessels to reduce explosion hazards to a minimum.

June 30. Captain Leb Curtis addressed us on the subject "Ship Salvage".

July 7, 1931. Professor W. C. Durand, Stanford University, will address us on the subject "Ships' Propellers" on which he is an authority, having written several books on this subject; he will also dwell on the experiences which he had while in charge of the ship's model test basin at one of the eastern universities.

New members welcomed to the club include:

E. A. Williams
W. R. Chamberlain
J. F. Bond
Jos. M. Costello
Wm. D. Leahy
Capt. J. W. Jory
Fred G. Archbold
Capt. John J. O'Meara
S. J. Porter
H. Garvin Hornlein
Thomas G. Munro

GOLF

The Golf Committee, a very efficient and energetic branch of our club is making plans for our annual fall golf tournament which will be held some week end in August at one of the out of town golf courses—it will be a family outing, dinner dance Saturday night, golf and banquet Sunday—we know this will be good.

HARBOR DAY

The San Francisco Junior Chamber of Commerce have again requested that the Propeller Club handle the merchant marine life boat races which will be held on Harbor Day, August 26, 1931. The board of governors have appointed the following Committee to handle this event:

Captain A. T. Hunter, chairman; J. A. Rumsey, S. E. Allen, Harry Haviside, and Vernon Showell.

Propeller Club Formed at Baltimore

The Port of Baltimore Chapter of the Propeller Club of the United States was formed June 11 at a dinner held in the Alcazar restaurant in Baltimore, and it is expected that within a short time a determined, well planned and concerted movement will be underway to push to the forefront the usefulness of this harbor. The name of the parent organization of "Propeller" was adopted, significant of a "driving force" and the branches might be likened to propeller blades that circle around and do the work.

About 71 representatives of the marine interests of the Port — of the shipyards, steamship lines, towboats, chandlery, and all the items that go to meet the requirements of the service—answered the invitation of the committee. After the dinner D. S. Brierly, who has been a member of the New York branch, gave an informal talk about the object and purpose of the work to be done by this fast growing organization. A nominating committee brought in the following names which were unanimously elected to office:

President: J. Sonderman, manager, Moore & McCormick S.S. Co.

Vice-Pres.: D. Brierly, manager, U. S. Salvage Co.;

Secretary: C. Schafer, manager, United American Metals Co.;

Treasurer: T. Hughes, Baltimore Copper Paint Co.

Board of Governors is made up of:

C. Pattison, vice-pres., R. J. Taylor Co.; G. French, vice-pres., Maryland Dry Dock Co.; W Stein, marine surveyor; J. Mitchell, marine surveyor; J. Dotten, Marine supt., Consolidated Navigation Co.; A. Dutten, manager, Norton, Lilly Co.; J. Kuhn; manager, Arundel Corp.; J. Johnson, manager, Spedden Shipbuilding Co.; T. Riley, manager, Export Steamship Co.; W. Hederick, U. S. Shipping Commissioner; C. Hastie, Lloyd's Surveyor, Port of Baltimore; and J. Ross, Principal Surveyor, American Bureau, Baltimore.

New Type of River Motorship

(Continued from Page 275)

will grind on the ice. All interior steel surfaces are painted with three coats of black Aqua Proof composition.

The Portland-Astoria run is one of the oldest regular steamboat routes on the Pacific Coast and is now nearing its century mark. Many a famous river craft of by-gone days has made steamboat history on this 110-mile stretch. It is now paralleled by highway and rail routes for bus, train, auto, and truck. The performance of the L. P. Hosford will therefore be watched with the keenest interest, as her owners figure that the combined savings of fuel and labor costs due to diesel operation and the more economical freight handling will approximate $41,000 a year as compared with the old wooden steamers.

Pacific Coast Shipbuilding Conference

PACIFIC Coast firms are seeking a share in the shipbuilding made possible under the Jones-White Act. Up to the present time, on account of the differential in freight rates on certain materials to Atlantic shipyards as compared with the same material to Pacific Coast shipyards, none of the vessels built under the provisions of the Ship Construcion Fund has been constructed on the Pacific Coast.

In a recent resolution adopted by the Pacific Coast commercial organizations and port authorities, it is pointed out that inasmuch as these loans are made from the federal treasury "to which the Pacific Coast contributes a considerable share," Pacific Coast firms are entitled "to consideration for ship contracts under reasonably competitive conditions." It is estimated that 55 per cent. of the total ships built under the Jones-White Act are for use on the Pacific trade routes. Under existing conditions, western steamship lines have felt obliged to let their contracts to eastern firms despite the record for efficient construction won by the Pacific Coast shipyards, and despite the undeniably advantageous climatic conditions which result in greater efficiency and shorter time for construction.

To offset this advantage of eastern shipbuilders, due to their proximity to steel centers, it has been proposed to allow the Shipping Board to make a one-half of one per cent. reduction in the interest rate on government loans for ships built on the Pacific Coast. A bill to this effect has been introduced in Congress by Albert E. Carter, representative from California, and is receiving the support of the Pacific Coast.

A. F. Haines, president of the Pacific Foreign Trade Council and vice-president and general manager of the American Mail Line, together with the Pacific Coast chambers of commerce invite shipbuilders, steamship owners, and all others interested to attend a conference on this subject. This conference is in connection with the Eighth Annual Meeting of the Pacific Foreign Trade Council (an organization comprising the foreign trade and maritime commerce committees of the chambers of commerce of the Pacific Coast) and will be held this year in Oakland, Cailfornia, on September 17 and 18. A session of the program will be devoted "to devising such a plan as will permit the existing and now idle shipyards on the Pacific Coast to share equitably in the ship construction made possible through federal aid." (Pacific Foreign Trade Council.)

Pacific Marine Review

AUGUST, 1931

New Turbo-Electric Floating Palace
S. S. President Hoover

Official Organ
PACIFIC AMERICAN
STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION
OF THE PACIFIC COAST

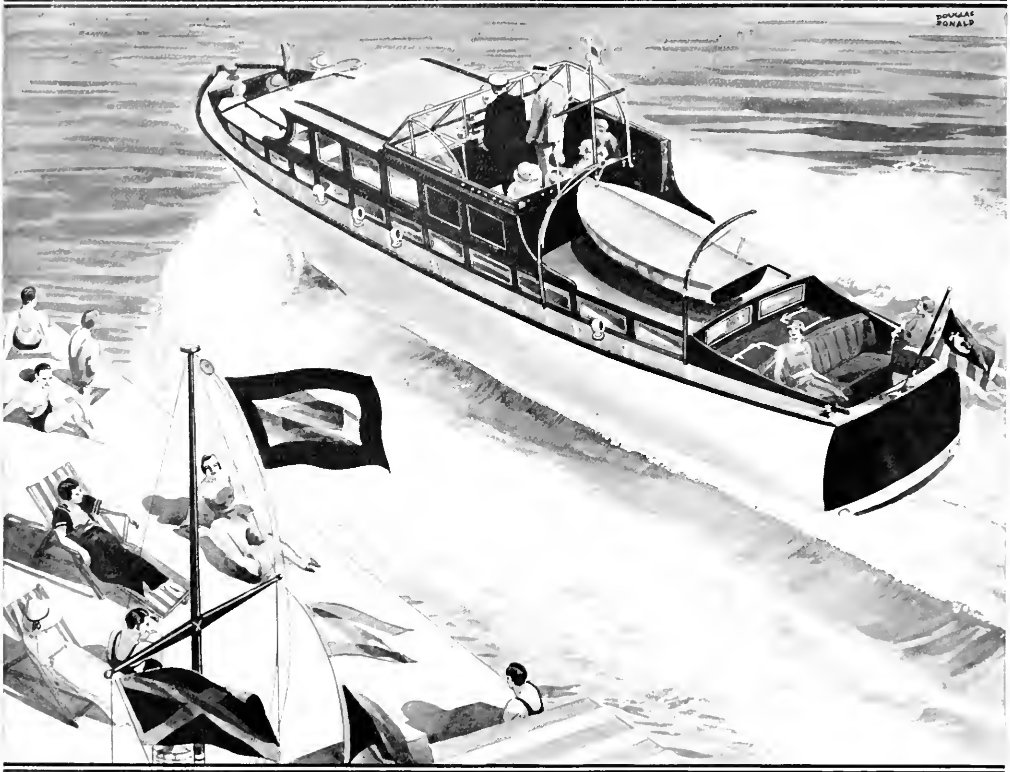
Huckins 48′ Fairform Flyer

Smartest of lines from bow to stern, luxurious in its appointments, and to accompany these, Huckins Yacht Corp., Jacksonville, Fla., has wisely chosen two Sterling Petrel 200 horsepower engines for propulsion.

Since its introduction to yachtsmen four years ago, the Sterling Petrel model has enjoyed a reputation for reliability and stamina, and was unreservedly accepted; for the Sterling Engine Company, as manufacturers of marine engines for 29 years, is recognized as a leader in its field. Unlimited source of engineering and accuracy of workmanship, combined with the finest of materials procurable has qualified this prestige.

Other models manufactured range from 12 to 600 horsepower.

A catalog will be forwarded to those advising the size and type of boat contemplated.



The Fairform Flyer, with a length of 48 feet and a breadth of 11 feet 3 inches, powered with twin screw Sterling Petrel engines of 200 H.P. each, has a sustained cruising speed of 22 M.P.H., with a top speed of 30 M.P.H., and a cruising radius at cruising speed, of 250 miles.

STERLING ENGINE COMPANY

BUFFALO, NEW YORK

Pacific Coast Representative **KING-KNIGHT COMPANY**

SEATTLE 3322 Henry Building | 601 Balboa Building SAN FRANCISCO | LOS ANGELES 401 Bradbury Building

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | AUGUST, 1931 | NUMBER 8

Contents

Official Organ
Pacific American
Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

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Official Organ
Shipowners' Association
of the Pacific Coast

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Editor.

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Advertising Manager.

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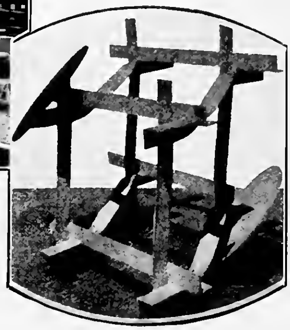


This typical Truss-Weld cell, after test, shows its great excess strength and stiffness. Ten tons pressure, applied diagonally, caused the first sign of any deflection, and, as pressure was increased and fractures finally did occur, not a single one was in a weld.

UNITED, Staten Island, Launches Its First Truss-Weld "Bottle-Tight" Barge

▼ ▼ ▼

Barge "N. A. D. CO. NO. 1", eleventh of thirteen hulls laid down under Truss-Weld patents though the first to be built by UNITED, was launched Tuesday, May 19th, at the Staten Island Plant. It measures 60′ x 20′ x 6′, has cargo capacity for 33,000 gallons of fuel oil, and was built for the Atlantic, Gulf & Pacific Co., New York, to be used as a tender for the Dredge SCROD of Boston. Two more hulls, derrick barges for the same company, are now under way and soon will be launched.

The permanent "bottle"-tightness of Truss-Weld construction is not its most important virtue for oil carrying. Truss-Weld barges, by eliminating all the usual heavy internal bracing members, simplify cleaning and avoid much of the tendency toward gas pockets; thorough stripping is easily accomplished because there are no obstructing frames to form pools. These barges carry more oil and draw less water than any others of like dimension.

During the past three years, Truss-Weld barges, with capacities as great as 350,000 gallons, have demonstrated their unmatched strength and rigidity many times by withstanding serious collisions, groundings while fully loaded and other strenuous tests, without a single instance of hull fracture.

Truss-Weld replacements for many units in service today would prove amazingly profitable. Wouldn't you like to know more about them?

▼ ▼ ▼

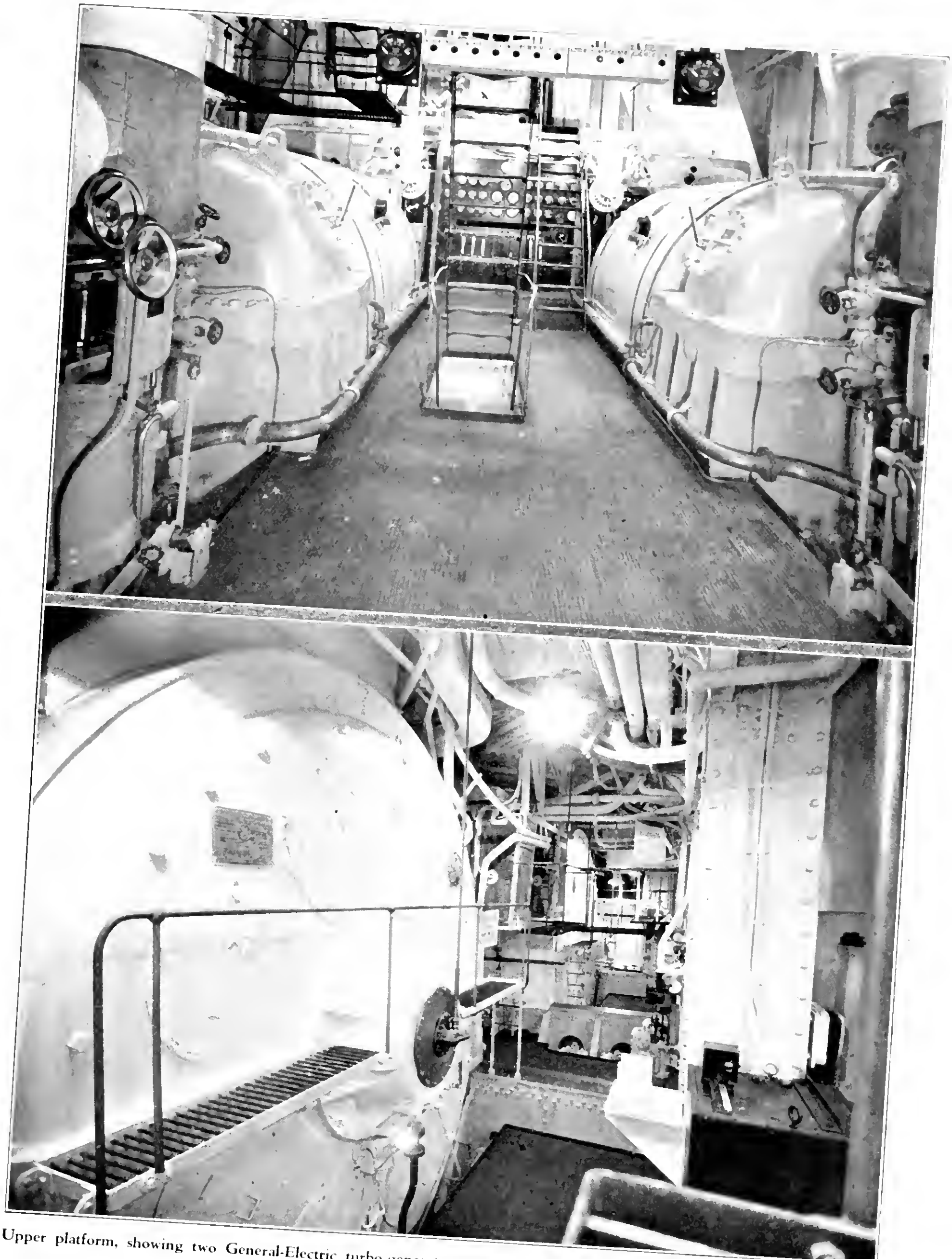
11 Broadway, N. Y.
Telephone
Digby 4-0500

UNITED DRY DOCKS
INCORPORATED

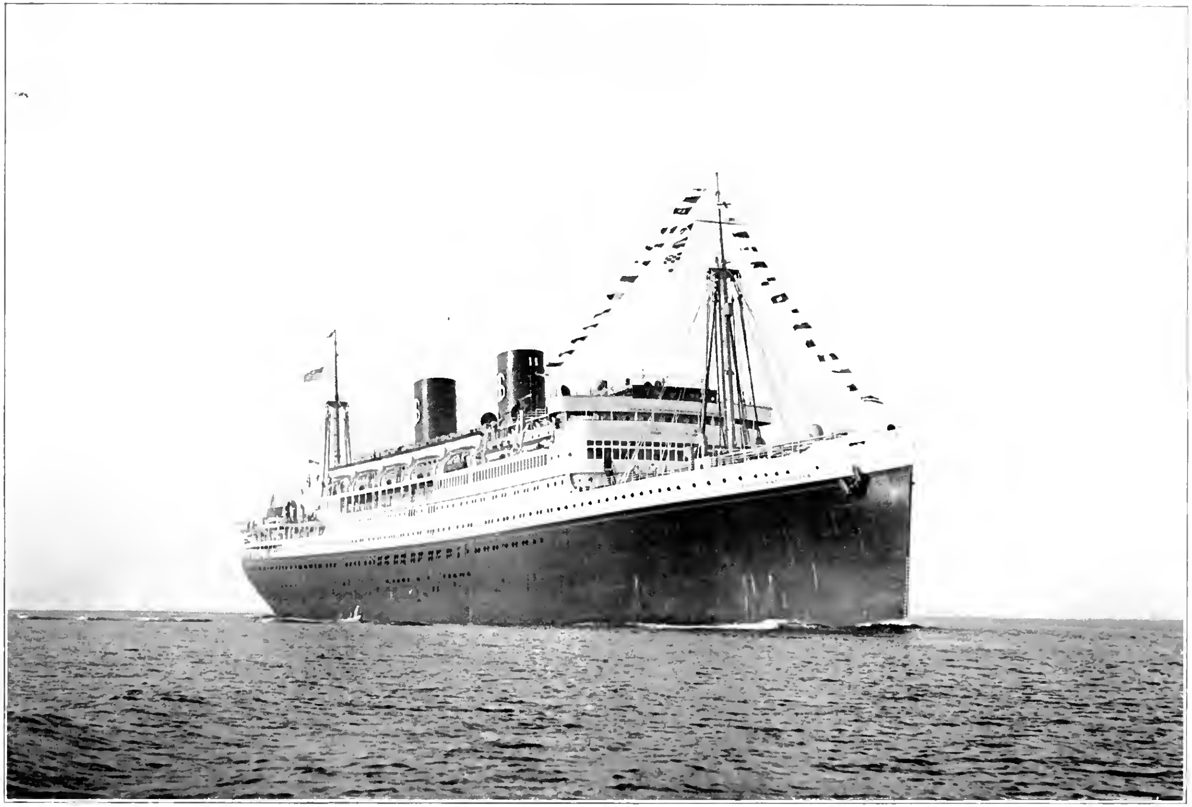
Morse-Fletcher
Staten Island
Crane Plants

Sole Licensee, Atlantic Seaboard, Kjekstad Patent Truss-Weld and Reverse-Channel Systems.

Engine Room of the Steamship President Hoover



Upper platform, showing two General-Electric turbo-generators and control stand. Lower platform, looking across forward end of propulsion motors. 26,500 shaft horsepower on two screws.



Turbo-Electric Passenger Liner President Hoover

Pacific Marine Review

VOLUME XXVIII — AUGUST, 1931 — NUMBER 8

Dollar Steamship Lines Fulfillment and Realization

Robert Dollar, Chairman of the Board.

ROBERT DOLLAR, eighty-seven years young, the dean of American shipowners, and the dominant figure in Pacific Ocean Shipping, is seeing the partial fulfillment of his prophetic vision and the realization of a large part of his life work. He has frequently proclaimed, when speaking on foreign trade, that "The center of the world's future international commerce will be somewhere on the Pacific, and America's great future expansion in foreign trade will be on the Pacific Coast." Believing ardently in this idea, he has used it as a slogan and has worked for its accomplishment with all of his great shrewdness and tremendous energy.

Steamship President Hoover is the beginning of fruition and fulfillment for this endeavor and this prophesy. Here is the largest and finest merchant vessel ever built in an American shipyard—and she was designed and built to the ideas of this greatest of Pacific Coast shipowners for his Pacific Ocean Services.

The life of Robert Dollar on the Pacific Coast began in 1888 when as a fairly prosperous Canadian and Michigan lumberman, then 44 years old, he moved to San Rafael, California, to avoid the effects of the rigorous North Michigan climate. Shortly after settling he began lumbering operations in Sonoma County, and a little later in Mendocino County, and in the Puget Sound country.

In 1895 (or thereabouts) he bought the Newsboy, a small wooden lumber schooner.

In 1901 he started in the transpacific trade with the steamer Arab, 6500 tons deadweight.

In 1902 Robert Dollar made his first trip to China.

It is noteworthy that this man started in his 57th year the work that was to make his name known throughout the world, and that this work was started mainly with the idea of opening up the Chinese market to Pacific Coast lumber.

To-day, Dollar Steamship Lines circles the globe with a first class passenger and express freight service that is the first of its kind in the world's history. The Dollar house flag and the Dollar stack are known in every great foreign port and are the most potent advertisements to the maritime nations that the United States of America is once more an international competitor in maritime commerce.

R. Stanley Dollar, President.

The Dollar Steamship Lines, Inc., Ltd., is a well managed organization, built upon the intelligent choice of competent executives in every department. That this organization functions smoothly and is in the hands of competent executives is very well illustrated in the planning and building of the Steamship President Hoover and her sister ship the Steamship President Coolidge. Although the home offices of the steamship lines and the yard of the Newport News Shipbuilding & Drydock Company are 3000 miles apart, the shipbuilding and the ship operating organizations were able to cooperate so thoroughly in design and construction, in alteration and equipment, that the Steamship President Hoover was delivered three months ahead of schedule date, and the President Coolidge will be delivered five months ahead.

Harold Dollar, 1st Vice President.

America's Finest

For Transpacific Service

Newport News Shipbuilding and Dry Dock Company Delivers to Dollar Steamship Lines Largest American-built Merchant Vessel and the Most Powerful Turbo-Electric Liner Afloat

S. S. PRESIDENT HOOVER, first of a pair of splendid electric liners made possible by the wise provisions of the Jones-White Merchant Marine Act and being built by the Newport News Shipbuilding & Dry Dock Company for the transpacific and intercoastal services of the Dollar Steamship Lines, Inc., Ltd., of San Francisco, was delivered by the shipbuilders on July 11 and leaves New York August 6 on her maiden voyage, arriving at Los Angeles August 22 and at San Francisco August 24.

The advent of this vessel in transpacific trade is of unique and outstanding significance. She is the largest merchant vessel yet built in an American shipyard, the first electrically propelled vessel in transpacific trade, and has the highest powered electrical propulsion machinery yet installed in a commercial liner. She is the first passenger liner to be designed and built for the Dollar Lines. She bears the distinguished name of the present President of the United States with which she was christened by the President's wife. No other vessel shares this honor.

For these and many other reasons, the marine fraternity of the Pacific Coast is looking forward to an inspection of the Steamship President Hoover with possibly keener interest than has been the case with any other vessel.

The general design embodies the ideas and the extensive experience of the owners in world wide cargo and passenger service, and anticipates future needs. Planned to meet specific requirements for speed, deadweight, cubic capacity, and passenger accommodation, this design complies with the requirements of the Postal Service for Class II mail-carrying; the United States Navy requirements for auxiliary service; the United States Public Health Service requirements for rat-proofing, fresh water piping, and general sanitary regulations; the United States Steamboat Inspection Service rules and regulations; the regulations of the International Convention (1929) for Safety of Life at Sea; and the Rules of the American Bureau of Shipping, under whose special survey the President Hoover was built.

The hull has a straight stem, slightly raked, and an elliptical stern of the protected rudder, or semicruiser, type. With these, and the two well placed masts and two stacks, the profile presents a very symmetrical appearance. She is of the complete superstructure type, having a combined forecastle and bridge deck. Above this bridge deck are three tiers of steel erections giving a promenade deck, a boat deck, and a sun deck over 30 per cent. of the vessel's length. The deck inside of the erections on the boat deck is 4 feet higher than on the outside in order to give greater headroom in the public spaces on the promenade deck. The promenade and boat decks overhang the sides of the vessel 18 inches, and the navigating bridge, which is at the level of the top of the boat deck house (95 feet above the keel), extends 3 feet beyond the maximum beam on each side in order to give an unobstructed view of the entire length of the vessel.

Hull Construction

The steel hull is constructed with transverse framing, and all scantlings fully comply with the rules of the American Bureau of Shipping. Side frames are all channels and are joggled to avoid the use of shell liners. Except in way of oil-tight flats they are continuous from tank top to the top deck in way of all side plating. The frames, generally, are of three sizes, the heavy section terminating at the main deck and the intermediate section at the shelter deck. These different sections are welded together in way of the beam brackets at those decks. Frames amidships are spaced 36 inches, and at the ends are reduced by steps to 24-inch spacing in the peaks.

All deck beams up to and including the promenade deck are channels fitted at every frame; above that deck they are, in general, angle beams. Decks generally are supported by three rows of girders and widely spaced pillars. Below the shelter deck these pillars are tubular and have welded plate flanges stiffened by welded brackets. There are seven fully plated decks in the structure, which number includes the promenade deck, the sun deck, and the boat deck inside the superstructure. Two expansion joints are fitted in the superstructure extending down to the promenade deck.

Subdivision of the vessel by ten transverse bulkheads provides a forepeak and three cargo holds forward, two boiler rooms, one engine room, three cargo holds aft, and an after peak. Practically all these bulkheads extend water-tight to the shelter deck; the forepeak extends to the forecastle deck. Further subdivision is provided by the bulkheads bounding fuel oil tanks forward of the boiler rooms, at the sides thereof, and between the engine and boiler rooms, and by those bounding fresh water tanks abreast the shaft alleys.

Stem and Stern

The stem is built up of four sections, the upper two being rolled steel bars and the lower two being steel castings of a bulbous form. All sections are connected by scarped joints. The forefoot is raised 3 feet 6 inches at forward perpendicular, the cut-up starting about 63 feet aft thereof. The bulbous bow form is of a medium type. Five sections of cast steel form the stern the three upper sections form the end of the semi-cruiser stern. A cast steel frame enclosed by riveted plates forms the semibalanced rudder of stream-line type. This frame is in three sections, the main section carrying ribs to stiffen the side plates and for attachment of the angle stiffeners on these plates. The two gudgeons have bronze bushings with lignum-vitae bearing surface and the wrought steel pintles have bronze casings. A rudder stock of forged steel 22 inches in diameter with a 3¼-inch axial hole, is connected to the rudder through a horizontal palm coupling by twelve body-bound bolts, the palm being fitted with a feather to relieve the shearing stress on these bolts. The weight of the rudder and stock is entirely supported within the hull by a bearing of the collar type located at the lower deck level.

Double Bottom

A complete double bottom extends from the collision bulkhead as far aft as the shape of the vessel permits. It is 60 inches deep amidships and is increased in depth in No. 1 hold and also at the after end. Longitudinally it is divided into eleven compartments by water-tight and oil-tight floors, and all but No. 1 and No. 11 compartments are also divided transversely by the water-tight vertical keel; in the two extreme end compartments the latter is nonwater-tight. All double bottom compartments forward of the engine room are fitted for carrying either fuel oil or water ballast, and those under the engine room and aft thereof are fitted for carrying fresh water only. A cofferdam is fitted between the oil and fresh water carrying divisions, and all drainage wells are fitted in accordance with the regulations of the International Convention for Safety of Life at Sea (1929). Solid floors, with suitable lightening holes, are fitted on every frame under the engine room, throughout the forward one-fifth length, and also for a considerable distance at the after end; in the boiler rooms solid floors are fitted on alternate frames, and elsewhere at every third frame with open bracketed floors between. Two side girders are fitted on each side of the centerline, intercostal between solid floors, and additional stiffening is fitted at the forward end and under the engine room. Frames in the double bottom are joggled, but reverse frames are straight and tank top plating is joggled.

Tanks

Athwartship fuel oil tanks are fitted entirely across the ship forward of the boiler rooms and between the boiler and engine rooms, and side tanks are fitted abreast of each boiler room. All tanks extend to the main deck, except that in way of the after athwartship tanks a cofferdam is fitted under the deck to accommodate piping. The athwartship tanks are divided transversely into four compartments and, in addition, the after ones are divided longitudinally.

A pipe tunnel is fitted through the tanks at the forward end of the boiler room and extends through No. 3 hold and part of No. 2 hold, with an escape trunk extending to the shelter deck.

In addition to some of the double bottom compartments aft which are used exclusively for carrying fresh water for domestic service, there are a number of built-in fresh water tanks. These tanks are located outboard of the refrigerating machinery space and abreast the shaft alleys and extend from the double bottom to the orlop deck. There are also two tanks on the centerline between the shaft alleys.

Homer L. Ferguson, president, Newport News Shipbuilding and Dry Dock Company.

An American Master Shipbuilder and His Greatest Ship

GENERAL CHARACTERISTICS S.S. PRESIDENT HOOVER

Dimensions:	
Length overall	654′-3″
Length on 32-foot water line	630′-0″
Length between perpendiculars (classification)	615′-0″
Beam, molded	81′-0″
Depth, molded, to Boat Deck, at side	79′-6″
Depth, molded, to Promenade Deck, at side	70′-0″
Depth, molded, to Bridge Deck, at side	61′-0″
Maximum draft, to bottom of bar keel	34′-0″
Displacement at maximum draft, tons	33,350
Tons per inch at maximum draft	94.9
Midship Section coefficient	.979
Block Coefficient (on water line length)	.675
Gross Tonnage	21,936
Net Tonnage	12,986
Capacities:	
Fuel oil (all available tanks), tons	6240
Water ballast (all available tanks), tons	5670
Coconut oil (tanks available for fuel or coconut oil), tons	1181
Fresh water, tons	2320
General cargo—bales, cu. ft.	556,000
Refrigerated cargo, cu. ft.	59,500
Power Plant:	
Propellers	2
Shaft horsepower	26,500
Speed at rated power, knots	20.83
Cruising radius (full speed), nautical miles	14,500
Cruising radius (cruising speed), nautical miles	19,500
Passengers:	
First class	307
Special class	133
Third class	170
Steerage	378
Total	988
Crew	324

The two masts are of riveted construction, with doublers at partners and hounds, but without stiffeners. Each mast heels on the shelter deck and is fitted with a topmast of tubular construction. Masts are fitted with stretchers to take the leads of the cargo boom topping lifts. It is interesting in view of the many arguments over necessary clearances for bridges over navigable channels that the topmasts fitted on the

President Hoover are telescopic and can be lowered about 28 feet.

Cargo Spaces

All cargo carrying spaces are located below the upper deck. Forward the three holds are divided into twelve compartments, all of which are used for general cargo, and in the three holds aft there are five compartments for general cargo, one for mail in bulk, and three for refrigerated cargo. The insulated cargo compartments, which are all in No. 4 'tween decks, are further subdivided into six rooms on each of the orlop and lower decks, and on the main deck into three rooms for refrigerated cargo and several for ship's cold stores. There are thus 15 insulated compartments for refrigerated cargo, each one of which may be loaded or unloaded without in any way affecting the others. This arrangement is particularly advantageous for the service in which the vessel will be engaged since it permits of diversified cargoes being loaded or discharged at any port of call with a minimum amount of handling and without in any way disturbing through freight of a refrigerated nature. All refrigerated cargo is handled through two trunked hatches extending through to the bridge deck, located one on the port and one on the starboard side of the ship. At each of the cargo deck levels an athwartship passage 10 feet wide connects the two hatches and provides a working space so that cargo may be loaded from either side of the ship into any compartment.

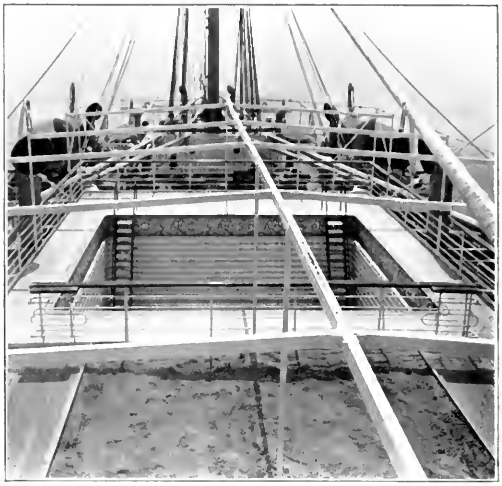
Sea Post Office

For the carriage of mail and postal matter there is a fully equipped sea post office on the upper deck with entrance from the special class lobby. A special enclosure for registered mail is fitted therein. Mail in bulk is carried in No. 5 orlop 'tween decks, and a special mail trunk connects this space with the sorting room. Mail is loaded through No. 6 hatch, the trunked portion of which adjoins the post office with which connection is made through sliding doors. Adjoining the post office and No. 6 hatch there is a special steel-enclosed compartment for the carriage of specie; and a similar room for the same purpose is provided in the No. 3 main 'tween decks.

Passenger Spaces

Accommodations are provided for four classes of passengers; First, Special, Third, and Steerage. In the regular first class spaces provision is made for 307 passengers, and this number can be increased to a total of 440 by use of certain rooms which are interchangeable between first and special classes. The first class accommodations are all located amidships, with staterooms on five different decks. There are 108 staterooms and four de luxe suites, each suite consisting of sitting room, veranda, stateroom, bath, and trunk room. These suites are located on the bridge deck in pairs, port and starboard. Of the 108 first-class staterooms, 8 are located on the boat deck, 2 on the promenade deck, 46 on the bridge deck, 38 on the shelter deck, and 14 on the upper deck. With only one exception all these rooms have private bath. There are 69 private bath rooms and 11 private toilets with showers, and, in addition, 17 public bathrooms and 11 shower baths for the exclusive use of regular first class passengers. Probably no other passenger ship afloat is equipped with so many baths in proportion to the number of passengers carried.

Staterooms for 133 special class passengers are all located on the shelter deck adjoining the first class quarters, and the 39 rooms provided are interchangeable between the two classes. A smoking room and a lounge on the bridge deck, two large lobbies and a barber shop on the shelter deck, and a dining room on the upper deck seating 120 persons are provided for the exclusive use of special class. A portion of the after end of the bridge deck is set aside for an open-air promenade and an out-door swimming pool is provided for their use in the trunked hatch to No. 5 hold. Six bathrooms and seven showers are provided for this class.



A novel construction feature in the superstructure of the Steamship President Hoover and one that will be much enjoyed by the first class passengers is a permanently built-in tiled swimming pool on the boat deck, equipped with sand beach.

Permanent accommodations for 170 third class passengers in 23 staterooms and a dining room seating 114 persons are located at the after end of the upper deck. A social room is provided for them on the shelter deck, and the exposed part at the after end of the latter and the after end of the bridge deck are set aside for their use as open-air spaces. Toilet facilities include 11 shower baths and one Japanese bath.

At the after end of the main deck there are permanent accommodations for 60 steerage passengers, and portable berths are installed in No. 5 and No. 6 main 'tween decks for 318 additional, providing for a total of 378. Permanent toilet facilities, including 14 shower baths, are provided for steerage use.

A hospital containing a dispensary and operating room, and men's ward, women's ward, and an isolation ward, each having an attached bathroom, is provided on the shelter deck aft.

Accommodations for a total ship's complement of 324 are installed. The captain, deck officers, and most of the engineers are located on the boat deck, and the crew at the forward end of the shelter and upper decks and amidships on the main deck. For the different departments seven messrooms have been provided, each having its own pantry service. A crew's barber shop and a crew's hospital with separate isolation ward, each with its own toilet, are located on the shelter deck. Passageways forward and aft permit the crew to go to either end of the ship without passing through any passenger space.

A clean hull is very essential in order that the Steamship President Hoover maintain her express speed of 21 knots. To insure a clean underwater body, the vessel is coated below the water line with germicide composition manufactured by the American Marine Paint Company.

Propulsion Machinery

To propel this hull economically and efficiently the owners selected the modern American electric drive as designed and built by the General Electric Company.

Several features were uppermost in the minds of the engineers when designing the powering equipment for the Steamship President Hoover. First, the item of modernity—the embodiment of the latest developments in the art up to the time of launching—second, the item of reliability— a power plant that could withstand any foreseen or adverse condition—third, minimum upkeep—powering equipment to operate year in and year out without one cent for repairs—and, fourth, efficiency.

The main power plant consists of two turbine generators each rated 10,100 kilowatts, 4800 volts, 2660 revolutions per minute, 3 phase; two main propelling motors of the synchronous-induction type, each rated 13,250 horsepower, 40 pole, 133 revolutions per minute, 3 phase, unity power factor; and one operating panel and control group for maneuvering the vessel.

Steam Generating Plant

Steam is generated at 300 pounds pressure and 200 degrees Fahrenheit superheat in 12 water-tube boilers of the well known Babcock & Wilcox interdeck superheater marine type. These boilers are located in two boiler rooms, six boilers in each room arranged three abreast with drums athwartship. The forward stack takes the flues from all boilers, the after stack being used solely for engine room ventilation. Steam drums of the three forward and three after boilers are fitted with desuperheating coils for furnishing steam to the saturated steam auxiliaries. The total heating surface of the 12 boilers is 57,600 square feet and the total superheating surface 5700 square feet. Each boiler is fitted with four Babcock & Wilcox Cuyama type burners for burning fuel oil under cold forced draft. Diamond soot blowers and Babcock & Wilcox automatic feed regulators are fitted.

In each boiler room are installed three Griscom-Russell fuel oil heaters, two of which have sufficient capacity to take care of the full load demand for six boilers. One Quimby horizontal motor-driven fuel oil pump in each fireroom supplies all 24 burners, and two Warren steam-driven vertical simplex oil pumps are installed as stand-by. Air is delivered to the burner fronts through ducts on the open fireroom system by four motor-driven Sturtevant Silentvane blowers.

Feed Heating System

The condensate is drawn from the main condensers by the condensate pump which discharges through the air ejector condensers to the feed tank. All the latent heat of ejector steam is thus conserved, no raw water pass being fitted. There are two Warren 3-stage centrifugal main feed pumps, each driven by a Terry turbine. Each main feed pump has sufficient capacity to supply all the boilers at full power. There are also three Warren independent steam-driven vertical simplex auxiliary feed pumps, one in the engine room and one in each fire room. The feed pumps draw from the feed tank and discharge through two Davis Engineering Company's heaters arranged in series and having sufficient capacity to heat the feed water to 300 degrees Fahrenheit. The first stage heater utilizes the exhaust from the steam-driven noncondensing auxiliaries, augmented by steam bled from the eighth stage of the main turbines. Steam for the second stage heater is bled from the third stage of the main turbines.

Main Condensing Plant

Each main generator turbine is served by a 14,000-square foot, 2-pass, surface condenser located immediately below the turbine. The condensers are support-

Two views of the open and enclosed promenade deck spaces on the Steamship President Hoover. Note, at right, the box girder extension of the Welin-MacLachlan gravity davits which combine the functions of a strength member in the structure of the ship and a run-way for the boat cradles.

ed on flexible beams so designed as to insure protection for the turbines from undue stresses due to the weight or vertical expansion of the condensers. Circulating water is supplied to each condenser by two-motor-driven Warren single-stage centrifugal pumps each having a capacity of 10,000 gallons per minute. Each condenser is served ty two 2-stage sets of Westinghouse air ejectors mounted on a combined inter-and-after condenser. Each ejector set has sufficient capacity to remove the air from the condenser which it serves when the propelling machinery is developing full power, the other set being used for a spare or in case of abnormal air leakage. Three Warren motor-driven centrifugal main condensate pumps of 250 gallons per minute capacity are fitted, one pump serving each condenser and the third pump being used as a stand-by.

Auxiliary Condensing Plant

The auxiliary condensing plant is in general similar to the main plant. In order to insure uninterrupted service for the auxiliary generators, which are of course vital to the operation of the main machinery, two condensers are provided, one serving the forward pair and one the after pair of the 500-kilowatt generator turbines. One 3600 gallons per minute Warren single-stage centrifugal motor-driven circulating pump of 3600 gallons per minute capacity serves each condenser. Twin Westinghouse air ejectors with inter-and-after condensers are fitted, similar to the main plant. Three 50-gallons per minute capacity Warren motor-driven centrifugal condensate pumps are fitted, one to serve each condenser, the third being a stand-by.

Main Turbines

The main turbines are of the downward exhaust type and are mounted directly above their respective condensers. The steam conditions at the main throttle valve are 275 pounds gauge and 200 degrees Fahrenheit superheat, and the vacuum at turbine exhaust 28.5 inches. The primary consideration in the design of the turbines was that of ruggedness. The rotors are milled out of a solid steel forging, and all wheels except the first are integral with the shaft. There are sixteen wheels, all of which contain one row of blading, except the first which has two. The blading is of exceptionally heavy construction, and the critical speed of the completed rotors is well above the highest running speed.

Control of the steam flow is by means of the main throttle valve and three subsidiary hand valves which permit minor steam flow adjustment without the necessity for throttling the pressure. The main throttle valve is remotely controlled from the main operating panel by means of a lever which actuates a hydraulic, oil-operated mechanism. The hydraulic mechanism is interconnected with the lubrication system and an over-speed tripping device which cuts off the steam supply automatically in case of overspeed or cessation of oil supply.

The turbine operates in but one direction of rotation and has but two steam sealing glands, one at each end of the turbine. There are two extraction openings for bleeding steam for feed water heating. The high pressure opening provides steam at 65 pounds gauge pressure, thus permitting of the attainment of 300 degrees Fahrenheit feed water temperature. The low pressure opening provides steam for the low pressure feed water heater at slightly above atmospheric pressure. As the turbine generators are electrically disconnected during warming up, this process is greatly simplified. They may be allowed to idle at slow speeds under their own steam with the certainty that there is proper heat distribution.

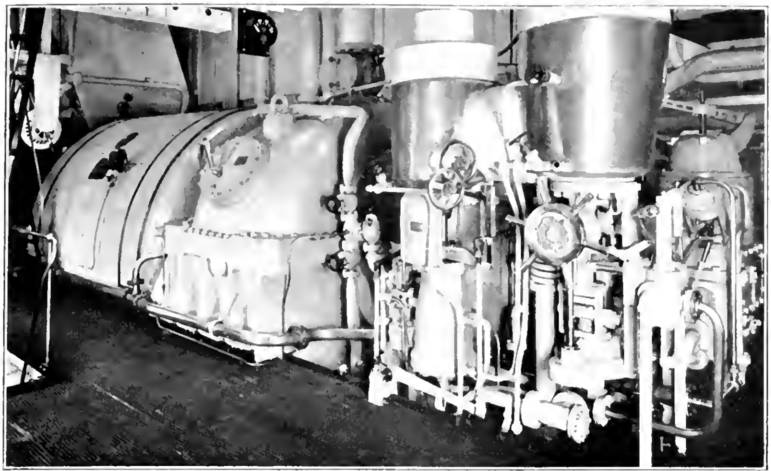
Main Generators

The main generators which are directly connected to the turbine shafts are of the totally enclosed, internally ventilated type, and are provided with external air coolers. Complete assurance against deposits of oil or dust on the windings is thus assured and, therefore, long life of the insulation. The fan which circulates the air through the windings and thence through the air cooler is mounted on the end of the rotor shaft. The tubes in the air cooler are supplied by circulating water from the main circulating pump discharge. The generator is of the two pole type.

The rotor is a solid steel forging and has slots mill-

One of the firerooms of the Steamship President Hoover featuring four of the twelve Babcock & Wilcox water-tube boilers. Note the neat and workman-like installation of steam piping. Fuel oil for these boilers is measured by Empire oil meters.

High pressure steam pipes are covered with 85% magnesia and with Johns-Manville Super-ex. Johns-Manville improved "Asbestocel" is largely used for low pressure steam pipe insulation and for insulating partitions and bulkheads.



One of the General-Electric turbo-generating sets of the main propulsion plant of the Steamship President Hoover showing steam control which may be arranged either for constant turbine speed or for constant steam flow.

ed in its face in which the field windings are imbedded. The stator frame is of built-up steel plate construction. The core is made up of laminated plates in which slots are provided for the reception of the windings.

Electric heating coils are located inside of the inner shields for the prevention of moisture accumulation on the windings during idle periods. The temperaure is kept at just slightly above room temperature (2 to 4 degrees Fahrenheit) in order to prevent condensation. Temperature coils are imbedded in the stator windings, and a testing device is situated on the operating panel for determining the temperature of the armature windings at any desired time. The generator field temperature is constantly visible on a meter situated on the operating panel. This temperature is based on a measurement of the field voltage and current and the known resistance of the windings.

Main Propulsion Motors

The main propelling motors are of the highly efficient synchronous-induction type operating at unity power factor. The stator frames are of built-up steel plate construction, and the rotor spiders are of cast steel. Like the generators they are supplied with stator temperature detectors and heating coils for the prevention of condensation on the windings during idle periods.

The induction motor windings, which are of the squirrel cage type and are used only when starting, are imbedded in the pole faces of the field cores and short circuited by means of end rings to which the copper bars are welded.

Control

The control panel has mounted on its face the various levers for maneuvering the ship, the rheostat control wheels for adjustment of the generator and motor fields, and the instruments for measurement of power. In the upper center of the panel are situated the steam and vacuum gauges and the clock.

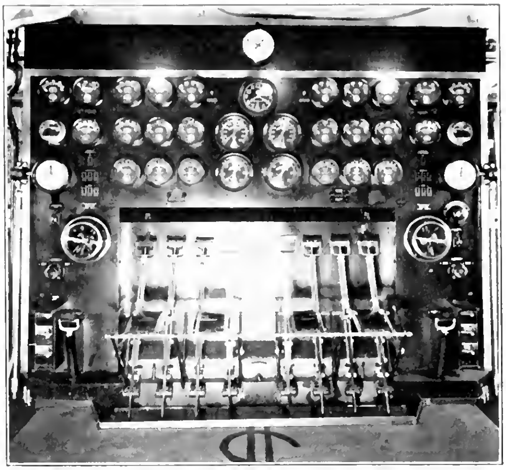
View on the lower platform of the engine room of the Steamship President Hoover featuring one of the main condensers with its two General-Electric motor driven Warren centrifugal circulating pumps.

Cross tie busses with switches are provided which permit of the parallel operation of the two propelling motors from either main generator. Under this condition of operation, the turbine generator not in use is shut down with its attendant condenser and auxiliary equipment.

The instruments on the panel are very complete and give instantaneous readings of ampere, volts, and kilowatts. An innovation is a watt-hour meter which records the measured power expended over any given length of time—hourly, daily, between ports, or for the voyage. These records will permit extensive study of the effect on propulsion of the factors which alter hull resistance such as draft, trim, wind, and cleanliness of hull.

The propulsion motors turn outboard for driving the vessel ahead, the starboard propeller being a right-hand screw and the port propeller a left-hand screw. Thrust is taken on independent Kingsbury two-collar type bearings immediately aft of the motors. Propellers are of the built-up type with three managanese bronze blades and semi-steel hub. Blade sections are of the standard ogival shape.

A De Laval No. 302, motor-driven centrifugal separator insures clean lubricating oil for the turbines and the propulsion motors.



Propulsion control board at the operating stand in the engine room. Maneuvering is accomplished by the movement of three levers for each motor and turbine. These levers are so interlocked that it is impossible to move them in wrong sequence.

Trial Results

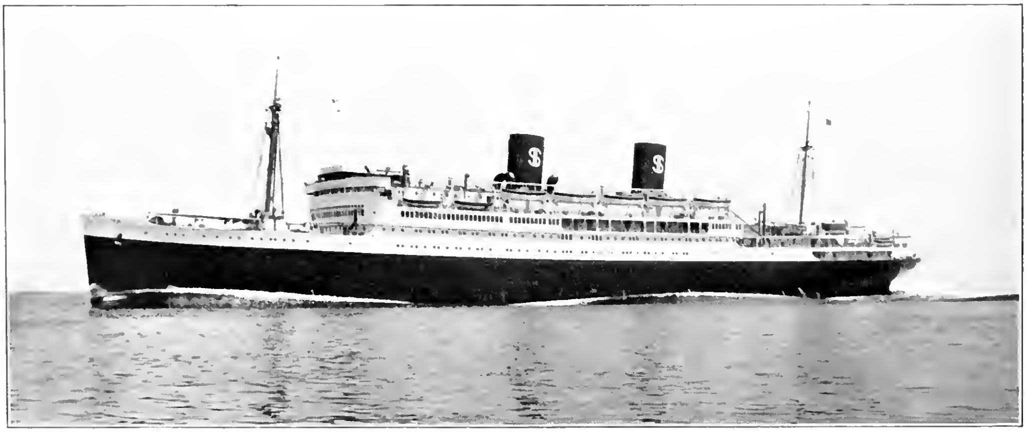
Steamship President Hoover was given a very thorough workout on her trials, receiving practically the equivalent of an official United States Navy standardization and economy test at the navy trial course off Rockland, Maine. A series of runs was made over the measured mile at five speeds, ranging from 15.5 knots to 20.5 knots. Then five runs were made at maximum power. Averages of the five high speed runs were 21.56, 141.5 revolutions per minute and 31,060 shaft horsepower.

This was followed by continuous eight-hour economy run at full rated power. On this run fuel consumed was measured in the same accurately calibrated measuring tanks that were used on the United States Navy penalty trials of the cruisers Houston and Augusta. The result of this test of the Steamship President Hoover was very satisfactory, as the following averages testify:

Shaft horsepower	26,495
Propeller revolutions per minute ..	134.4
Corresponding speed, knots	20.83
Consumption of fuel for all purposes, in pounds per shaft horsepower, corrected to 18,500 B.T.U. per pound ...	0.669

This fuel consumption figure compares very favorably with the recent records of the most modern steamships, particularly when we take into the account the conservative steam temperature and pressure and the absence of air preheaters and economizers.

On the run back to the yard the ship operated for several hours using only the forward fireroom and the starboard turbo-generator. In this condition she easily made 16.5 knots with a fuel consumption of 0.78 pound. This satisfactory economy at cruising speed is one of the most valuable features of the electric drive for passenger vessels.



Steamship President Hoover running at 21½ knots on her trials on the measured mile off Rockland, Maine.

A New Spirit in the

Architectural Treatment of Passenger Accommodations

San Francisco Interior Architects and Decorators Create a New Atmosphere in the Public Rooms of America's Greatest Transpacific Liner

WHEN the Newport News Shipbuilding & Dry Dock Company had submitted satisfactory preliminary general arrangement plans for the Steamship President Hoover, the Dollar Steamship Lines, Inc., turned these plans over to A. F. Marten Co. of San Francisco, asking that firm of experienced Interior Architects to collaborate with the owners and builders in the development of an interior arrangement and the creation of an interior atmosphere that would satisfy the standards of living and the present and future demands of the American traveling public.

Into this arrangement and atmosphere must be incorporated the most practical and up-to-date equipment to meet the requirements of this vessel in the world-round service for which she was designed, with its varying climatic conditions and its comparatively long ocean runs.

A general plan based upon the survey made by the A. F. Marten Co. having been found acceptable, detail deck plans were developed for the allotment of spaces to public rooms, suites, staterooms, lobbies, and passageways. On the completion of this preliminary work and in order to safeguard their future activities and their purpose to attain the best result that could be produced, A. F. Marten Co. made and set up in its San Francisco shops miniature models of the several types of stateroom. From full consultation of owner, builder, and interior architect over these plans and models, complete specifications for all materials and complete interior architectural plans were developed. Equipped with this "layout," an executive and expert architect and designer of the A. F. Marten Co. went to the shipyard to consult and cooperate with the naval architects in fitting the scheme to the actual hull. Upon his return to San Francisco detail design drawings were made, and prints of these drawings, together with full size samples of panelings, carvings, wood selections, and finishes, were forwarded to the shipyard.

As a result of this thoughtful handling of every detail, the A. F. Marten Co. has successfully planned, designed, and supervised the entire interior scheme, produced in its San Francisco workshops practically all of the furniture and furnishings, shipped these all to the Atlantic seaboard, and installed them on the vessel—without a single mishap. The genius and skill of

The first class lobbies on the Steamship President Hoover present very beautiful effects in hardwood paneling and in specially designed, many-colored patterns in rubber flooring.

the interior architect are definitely evidenced in the splendidly fine result attained, which in some measure may be appreciated from the illustrations.

First Class Accommodations

In all modern passenger liners, the first class accommodations are grouped amidships, and on the President Hoover these form a five-story, first class hotel, the first floor being on the upper, or C, deck, the top floor being the boat deck, and the roof, or sun deck, being equipped for out-of door games.

On C deck are located the main entrance lobby, the dining rooms, the kitchens and pantries, and fourteen first class staterooms. A large lobby, modernly equipped purser's, doctor's, and chief steward's offices, and thirty-eight staterooms are located on B deck. Deck A has two spacious lobbies, a novelty shop, a barber shop, a beauty shop, 45 staterooms, and four special suites. The promenade deck, given over entirely to first class passengers, contains enclosed and open deck promenades, a library, a lounge, two lobbies, a smoking room, a veranda cafe, a soda fountain room, and two single staterooms. Eight staterooms, a gymnasium, a therapeutic room, a children's playroom, two lobbies, and an outdoor tiled swimming pool occupy the boat deck.

Upper-C-Deck

A vestibuled port at each side of the ship gives access to the spacious entrance lobby on C deck. On entering, the first impression is that of spaciousness. A deep and wide recess in the after bulkhead around the beautifully molded center line main stairway gives breadth, so that the room has effective dimensions of 22 feet by 80 feet. This effect is heightened by the light tones of the framire paneling, with panel strips of white birch and African mahogany trim. Ceiling and walls are completely covered with this combination. Deep fore and aft beams of the hull, with their large bulkhead brackets, are encased in hardwood, thus forming an interesting arched effect.

Opening off the recess on each side of the main stairway are coat rooms for dining room service and entrances to the two passenger elevators. Both elevators serve C, B, A, and promenade decks, and the port elevator serves also the boat deck.

At the center of the forward bulkhead, opposite the stairway, there is installed a large fluted, gilt fernery with a ceramic plaque insert. Surmounting this fernery is a large, gilt-framed mirror set between special tubular lighting fixtures of white glass and polished brass.

After end of the central well in the first class dining saloon featuring the grand stairway and the mural by Frank Bergman emblematic of the Dollar round-the-world steamship service.

The Goodyear rubber flooring is in shadings of green and tan especially developed to meet the ideas of the interior architects. High back chairs in walnut with unique hand decoration combine with interesting groupings of upholstered pieces, tables, and floor lamps to complete an entrance lobby that pleasingly suggests comfort and harmony while preserving an air of distinction.

Dining Saloon. Opening off this lobby aft is the dining room, a compartment which seats at small tables 272 persons. This majestic room is U shaped, the main room being 80 feet wide and 50 feet long, and each of the two wings 28 feet wide and 40 feet long. In the center of the main room there is a large well extending through A deck, and over the sides and wings there is a clear ceiling height of 10 feet 6 inches.

Built on a foundation of Goodyear rubber flooring in varying tones of light green, the color scheme of this room comprises an entirely new tonal value of pinkish-grey for the wall and ceiling panels, with applied moldings in gold leaf and inset carved panels on all columns and pilasters, also in gold leaf. Doors, staircase, and tables are in walnut. The chairs have satinwood frames with striped coverings in varying red tones; and the draperies are in glacier green mohair.

The chief architectural features of this room are the ceiling well and its grand staircase communicating with first class passageways on B deck port and starboard. Beautifully carved plate mirrors ornamented in gold leaf and set between wide, slightly concave, painted pilasters adorn the sides of this well. On each side two groups of three mirrors each, about half length, are set in the sash so that they can be dropped into pockets in the joiner work for ventilation. In the passage bulkheads openings are cut in way of these sash and fitted with polished brass hinged grilles. A scolloped cornice ornamented with carved composition is fitted around the top of the well to form a trough for indirect lighting of the well ceiling.

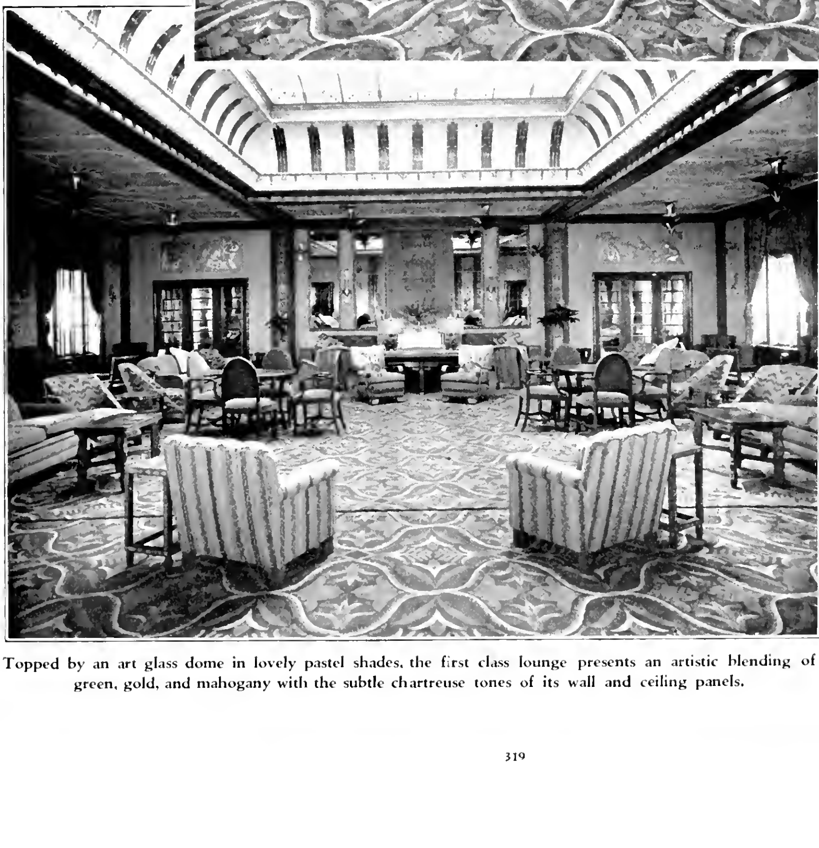
The grand stairway is built of walnut with carved walnut rail and newel posts with bronze balustrades. It is truly artistic and beautiful in design and craftsmanship. The center panel on the after bulkhead of the dining room above the stair landing is decorated with a fine mural by Frank Bergman picturing the five continents emblematic of Round-the-World steamship service.

Air and light ports in way of the dining room are arranged in groups of four. Each of these groups is recessed and the recess is beautifully finished in paneling with a narrow decorated mirror panel set between the vertical pairs of ports. No attempt is made to mask the ports with false windows. Utley patent swinging ports, built under license by the shipbuilders, are used in this space and in all staterooms.

A private dining saloon accommodating 18 persons is provided aft of the first class dining saloon on the port side of the ship. The finish of this room is similar to that of the main dining saloon, except that silver leaf ornamentation has been used instead of gold, and the paneling is decorated with murals of oriental design in tinted silver leaf, the general color scheme being salmon and blue.

China and silverware for these dining rooms were supplied by the Dohrmann Hotel Supply Company of San Francisco. The china includes Hall, Scammell Lamberton, and Syracuse. The silverware is by Gor-

Spacious and Beautiful



Topped by an art glass dome in lovely pastel shades, the first class lounge presents an artistic blending of green, gold, and mahogany with the subtle chartreuse tones of its wall and ceiling panels.

ham and the glassware in thin blown old rose is by Bryce Brothers.

The Shelter B Deck

In the way of the stairs in the first class lobby on B deck and on all decks the walls are finished in full height panels of avoidire between narrow panel bands of satinwood with yellow poplar moldings. Elsewhere the walls of this lobby are divided into a checkered pattern of small square panels of framire with alternate vertical and horizontal grain with narrow panel strips of molded white birch and pilasters and trim of African mahogany. Cornice and paneled ceilings are in white enamel.

Goodyear rubber tiling, specially designed by the interior architects, covers the floor with large modern block patterns of red, gold, black, and green shades. Lighting fixtures of harmoniously pleasing design enhance the decorative treatment. Comfortable chairs and settees are covered with specially woven fabrics.

Staterooms. Adjoining this lobby at its forward side is the purser's office. Its large opening with decorative brass grillwork forms a pleasing panel opposite the main stairway. Forward and aft of this lobby passageways, port and starboard, lead to first class staterooms. These passageways are paneled in plywood with rubbed enamel finish in cream or light salmon shades.

The staterooms or bedrooms are similar in arrangement and dimensions to the bedrooms of a modern, first class hotel. Each first class stateroom has two single metal beds with the exception of two single rooms on the promenade deck. Each first class stateroom has either private or communicating bath or shower. Thirty-nine rooms have exclusive private bath, and three have exclusive private shower, while 52 have private bath communicating with two rooms. The equipment and arrangement in these 52 rooms are practically standard throughout and strike a new note in passenger comfort.

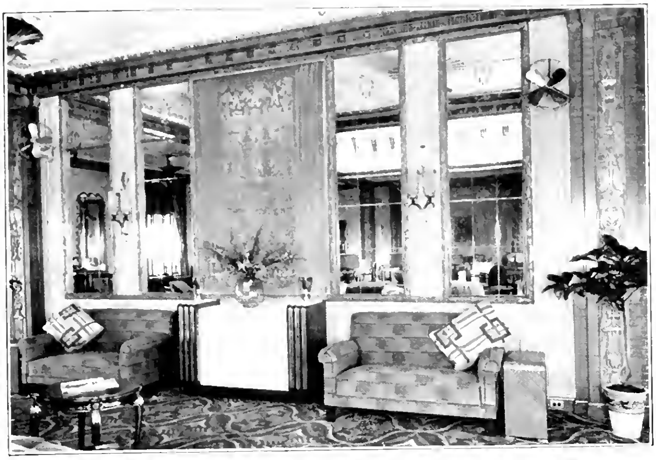
The door opens on small vestibule which communicates through arched openings with a dressing room at its side and with the bedroom at its end. This dressing room is equipped with two large built-in wardrobes and two lavatories, with a door giving access to the communicating bath. By this arrangement all plumbing connections and all sanitary fittings are entirely removed from the room, allowing a much better arrangement of furniture and fixtures to make a pleasing combination bed and sitting room.

The furniture in all first class rooms consists of two full size twin beds, in metal, built especially for this ship by The Rome Company of San Francisco to the design of the interior architects. The color combination for these beds is green and orange, and the design is very pleasing. All these beds, and those of the special class, are equipped with the De Luxe type coil bed spring which was developed by the Rome Company. It is claimed that this bed spring is unsurpassed for restful repose, and passengers on the President Hoover will obtain a new idea of sleeping comfort at sea.

The mattresses for these beds are Simon Pure hair and inner spring type manufactured by The Simon Mattress Manufacturing Company of San Francisco. The inner springs of these mattresses are made of special material and are especially heat treated and retempered after coiling to make them rust-proof. The mattress filling is of finest quality hair (grey draw-

A beautiful apartment is the library and writing room, shown at left. The walls are finely paneled in African mahogany with marquetry inlaid decorations. In the center of the after bulkhead is a large mural depicting submarine life. This painting, illustrated above, is from the brush of A. F. Marten.

Decorative and Architectural Features



At left, after end of first class lounge featuring carved glass and ebony console with antique Sumatran silk mural and carved mirrors. Above, one of the decorative wall consoles and mirror of the lounge.

Lobby stairways form some of the most attractive architectural features on the Steamship President Hoover. This group of illustrations shows this feature in the forward lobbies of the first class section running up from C deck to the boat deck.

ings), the ticking is tufted by the patented Sanotuf process, and all metal ventilators are rust-proofed. The bed springs are covered with Simon Pure Spring covers in matching color and quality with the mattress ticking. Special "President" pillows are supplied to first and special class.

Blankets for these beds were especially woven by the Oregon City Woolen Mills of Oregon City, Oregon. There are two blankets for each bed. The top blanket is ocean blue on the face and gold on the reverse, with an attractive woven-in scroll design (reproduced from a decorative motif used in the ship's furnishings) across its ends. At each end of these scrolls the words "Dollar Lines '31" are woven in. The make-up blanket is a solid gold color with a modernistic weave effect, especially created for the ship. The Oregon City Woolen Mills, which is the pioneer woolen mill of the West, supplied also the steamer rugs, which are woven in a special shadow plaid design of beautiful brown and tan shades and finished with felt-bound ends. This mill is one of the few American mills equipped with the Jacquard looms necessary to produce these special designs.

In addition to the beds, each of these first class staterooms contains a settee large enough to serve as a day bed, two bedside tables, one mahogany combination dressing table and desk, chairs, and a collapsible table.

All bath tubs have showers installed, the tub being piped for hot and cold salt water and the shower for hot and cold fresh water. All exposed metal fittings, such as faucets and supply and drain pipes, are chromium plated.

Both the bedroom and the bathroom are supplied with mechanical ventilation and are equipped with Westinghouse surface-mounted heaters, 660-watt capacity in the bathrooms and 1000-watt in the bedrooms. These heaters are enameled in colors to match the bulkheads upon which they are mounted.

The Bridge A Deck

On A deck the two first class lobbies are finished in paneling of the same hardwoods as on B deck with similar color scheme in the rubber flooring. The furniture consists of a variety of chairs and settees in light primavera and walnut, with special fabric coverings in nut brown, blue, and yellow, and a large center table made of light finish mahogany with silver trim. Just forward of the forward lobby is the novelty shop, and the forward bulkhead of this lobby is formed into a concave counter fitted with show cases in solid bronze frames with interior trim of hardwood. At the after end of the after lobby are the barber shop and the beauty parlor. The two rooms, finished in light shadings of green, with chromium silver trim, are completely equipped for their respective services.

De Luxe Suites. The four suites de luxe, located amidships on A deck, are most completely equipped and express the utmost in convenience, comfort, and luxury. Each suite consists of a private veranda, a living room, a bedroom, and a bath room. Two suites, one port and one starboard, are splendid exemplifications of the "art moderne," the other two are in conventional French style.

In the two "suites moderne" the walls of the living room and the veranda are paneled in padouk (a Burmese wood of the mahogany family). Living room furniture is made of zebra, macassar, and harewood, an outstandingly clever piece of craftsmanship being a combination desk and chest of drawers with concealed lighting. Golden brown, red, and black tones in draperies and coverings combine with a specially developed carpeting in blue to form a very effective and pleasing color scheme for the living rooms. Rubber tile of a pattern and coloring to harmonize with the treatment of the suite is laid on the veranda decks, and these spaces are furnished with gaily colored modern porch furniture of a most comfortable type.

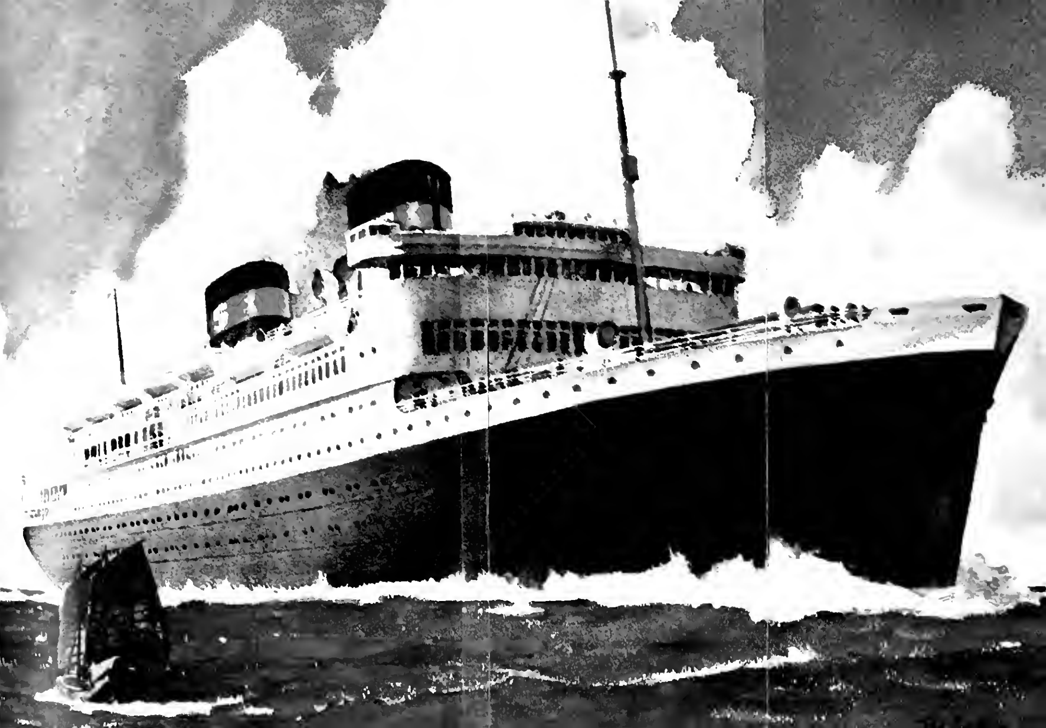
Bedroom walls are painted a light glacier blue, the carpet is a darker blue. The bedroom furniture is of flamed Jamo veneer trimmed in silver and consists of twin beds, bedside table, dressing table and mirror with lighting fixtures, and chairs.

The two French suites have living room and veranda paneled in primavera and bedroom painted in pastel shades in keeping with the French influence.

Promenade Deck

Devoted entirely to first class passengers, the promenade deck is completely occupied with open and clos-

Three views showing the attractive treatment of the large doorways connecting lobby and lounge, and lounge and library, on the promenade deck. The panels over the four doors of the lounge are beautiful plaques in relief depicting the four seasons.



Suites de Luxe

The four suites on A Deck are in pairs, two decorated in Moderne motif and two in French style. Each of these suites has a veranda with three outside Kearfott windows, a living room opening to the veranda with a door and three large windows, a bedroom, and a bathroom. They are exquisitely finished in beautiful color schemes and furnished with many outstanding examples of master craftsmanship.

ed promenade spaces and public rooms. It is approached by elevator or stairway through a splendid lobby—a room 54 feet long, 25 feet wide, and 23 feet high in its central portion—completely paneled in avoidire with satinwood strips designed to carry out a repeated herringbone pattern over the entire room. This pattern is accentuated by pilasters and columns of mahogany decorated with gold inset strips.

Over the entire enclosed space on the promenade deck there is a four-foot elevation of the boat deck to give more ceiling height in the public rooms.

Lounge. Forward of the lobby and connected by large swinging doors port and starboard is the lounge, a room of great spaciousness—52 feet by 54 feet—entirely free from columns and with a 13-foot 6-inch ceiling relieved by a large, full-height skylight dome in its center. This room is lighted by six groups of unusually large Kearfott casement windows with draperies of heavy silk brocade in tones of gold and pale green.

Paneled in plywood enameled a subtle shade of chartreuse and set off by gold leaf applied moldings, the walls of this room are finished with a baseboard of primavera and a narrow carved cornice of the same material faced with satinwood at the top and crowned by a deep composition molding. Satinwood pilasters in a striking design are decorated with inset carved panels of primavera and have fluted capitals of the same wood. Girder casings are of primavera faced with satinwood.

The ceiling is fitted flush, divided by narrow molded panel strips and decorated with gold leaf composition moldings. Each large ceiling panel has, at its center, an indirect lighting fixture of the sunburst design finished in dull and polished gold and dull chromium plate.

A high pile Saxony wool carpet of special pattern in green, dark grey, and mahogany shades covers the entire floor, making a perfect base for a color scheme, that is greatly enhanced by the carefully selected stained glass of the central dome in which soft pastel shades of amber, gold, and lavender filter sunlight by day and reflect illumination at night.

The lounge is luxuriously furnished with large overstuffed chairs and settees upholstered in modern fabrics, and numerous occasional tables of various designs, all inlaid in rare wood of many kinds and some of them further ornamented with carving and gold leaf. Outstanding pieces of cabinet work in the lounge are: a large table with Tarsia top of satinwood and base inlaid with satinwood, rosewood, and maccassar ebony; four wall cabinets of Zebra veneer and ebony with carved and gilded mirrors above; and a Chickering grand piano with frame of satinwood and ebony especially designed and built for this room.

Library and Writing Room. The lounge at its forward end opens directly into the library through large three-fold swinging doors, port and starboard. This room, 28 by 52 feet, less the area taken up by the stage recess of the lounge, has walls paneled full height in large slabs of center-matched mottled African mahogany, with side margins decorated with marquetry inlays in many hardwoods, including American and Circasian walnuts, curly maple, yellow poplar, harewood, bubinga, tigerwood, zebra, and vermilion. Fluted pilasters, hand carved capitals, and narrow cornice, all of African mahogany, are crowned by a deep cove molding of painted white pine.

A flush ceiling of enameled Vehisote is divided into panels by carved composition decorative moldings and is provided with polished brass grills for exhaust ventilation. Completely covering the floor is an especially designed rug of pleasing green base with patterns in shades of terra cotta, lavender, light green, and gold.

Smoking Room. From the main lobby on the promenade deck, wide passage lobbies, port and starboard, lead aft to the smoking room. In these lobbies there are large alcoves furnished with comfortable chairs and settees, and in one of these alcoves on the starboard side is fitted up a stock exchange board. Entering the smoking room from these lobbies we find ourselves in one of the largest and most impressive public spaces on the ship—a room 50 feet by 50 feet—completely paneled at sides and overhead in West African bubinga, with a rich dark red mottled grain. The wall paneling is flush except where it is set back in connection with groups of recessed Tudor arches, apparently resting on narrow molded pilasters between the panels, and each recess is bounded by full-height carved corner posts fitted with carved capitals. All structural columns in this room have square paneled casings with carved corner posts similar to those at the arch recesses.

The group of public rooms for special, or tourist, class on the Steamship President Hoover is notably outstanding in beauty and comfort. Our illustration shows a corner in the special class lounge.

Smoking Room
Veranda Cafe
Soda Fountain

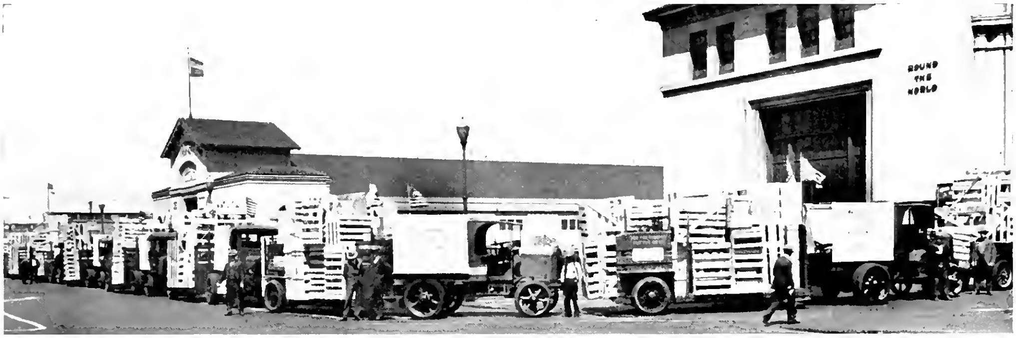
Completely paneled in bubinga of a rich dark red mottled grain, the smoking room presents very original architectural treatment and an entirely new departure in lighting fixtures. The deck beams are completely encased, and between each beam a coved panel is fitted. In order to get adequate illumination for this dark hardwood interior, twelve flood light, trough type fixtures, each 9 feet long, are installed in the cove beam ceiling. The drapes are of hand-blocked linen with bright colored patterns.

At the after end of the promenade deck and extending for the full width of the ship is the veranda cafe which can be easily converted into an outdoor compartment by lowering the Kearfott windows which occupy both sides and a large part of the after wall. This room opens forward into the soda fountain room, shown at the right, which is said to be the most complete and elaborate eouipment of its kind ever installed aboard ship.

Marine Tea Garden. At the after end of the promenade deck the marine tea garden is enclosed at the sides and most of the after end with Kearfott sliding frameless plate glass storm windows, which, when opened in favorable weather, make it practically an open air space. In way of the windows, the walls are paneled in teak, with window trim of the same material. Elsewhere the walls are flush paneled full height and painted an old rose color, and the center panels at each end are decorated in a conventional stencil design done in tinted silver leaf, the baseboard, cornice, and panel strips being of teak. The well over the middle of the space is flush paneled at sides and painted to match the walls. A paneled ceiling, with white paint finish, is fitted under the beams in the well, and similar ceiling with teak panel strips is fitted elsewhere.

Soda Fountain Room. The soda fountain room adjoining the marine tea garden is invitingly finished in color. The wall panels are decorated with conventionalized flower and fruit, above a paneled wainscot with molded chair rail, and are set off by wide full height pilasters with applied moldings in modern designs. The doors are of teak with painted trim and applied decoration above head casings, and windows are of sliding type with frameless glass arranged to drop into pockets in the joiner work. A flush paneled ceiling is fitted overhead.

Standard, first class passenger staterooms are notable for their roominess and comfort. Beds are by Rome; mattresses by the Simon Mattress Manufacturing Company; blankets by Oregon City Woolen Mills, all to special specifications. The result strikes a new note in sleeping comfort for Pacific Ocean passengers.



The John McCarthy & Son fleet of trucks delivering furniture from A. F. Marten Co. factory to the Dollar Line piers, San Francisco.

Gymnasia at sea. The gymnasium, pictured at right, was planned and outfitted by the Pacific Coast representative of the Gymnasium Department of A. G. Spaulding & Bros.

Outfitting A Modern American Liner

Steamship President Hoover Auxiliaries and Equipment Represent Every State in Union

EQUIPPING and outfitting a large passenger and cargo liner is always a matter of great interest. Here is a great structure of steel, designed and shaped to float safely on the sea in all conditions of wave and wind and to drive through the sea with the least practical resistance to its onward motion. Here is a self-contained power plant to generate and apply energy sufficient to drive this structure through the sea at 25 miles an hour and, in addition, to perform all the functions necessary for the comfort and health requirements of some 1300 persons and for the handling of some 20,000 tons of cargo, baggage, stores, and fuel. It is obvious that the problem of best equipping such a structure to make the most economical and satisfactory use of its functions, considered from the viewpoints of both owner and passenger, is a very complex problem.

In the case of the Steamship President Hoover, this problem was settled by intelligent cooperation between the various departments of the Dollar Steamship Lines, Inc., Ltd., and the shipbuilders; and, since this vessel is the first in many years built in an American shipyard for American transpacific trade, her equipment is of special interest and is here described in considerable detail.

Auxiliary Light and Power Generating Plant

FOUR General-Electric, marine-type, turbo-generator sets are installed in the port side of the machinery flat in the engine room. Each of these sets is of 500 kilowatts capacity, three being sufficient to take care of all demands and one acting as a stand-by. The steam turbines are designed to operate at 300 pounds steam pressure and 200 degrees Fahrenheit of superheat. One turbine is arranged also to operate noncondensing at reduced load on 175 pounds steam gauge pressure and 15 pounds back pressure. These turbines are provided with overload capacity to carry the load required for overexcitation of main propulsion generators when starting up, superimposed on the normal rated generator load. There are five stages of turbine blading operating at 4779 revolutions per minute and connected through reduction gearing to the generator shaft which operates at 900 revolutions per minute.

On the generator flat of the Steamship President Hoover's engine room are installed four General-Electric 500-kilowatt turbo-generating sets.

The generators are of the 120/240-volt, 3-wire type, each having a compensator for supplying the excitation neutral bus. The neutral bus for the 115/230-volt lighting system is supplied through two 300-ampere rotary balancer sets arranged for operation singly or in parallel, the other for general auxiliary power and for lighting. All generator switches are double-throw to feed either bus. Any combination of the four generators can be run on the auxiliary power bus but the switches are mechanically interlocked to prevent paralleling any two generators on the excitation bus, although any one of the four may be used on this bus.

There are installed on the ship a total of 187 motor-driven auxiliaries with an aggregate rating of considerably more than 3000 horsepower. The motors are, in general, of the General-Electric enclosed ventilated drip-proof type for under-deck auxiliaries and the General-Electric enclosed water-proof type for deck auxiliaries. Practically all controllers are of the magnetic contactor type with drum type master controllers for the cargo winch and warping capstan motors and push-button control for others.

For auxiliaries in engine and fire rooms the starters, push buttons, and also the field rheostats for adjustable speed motors are located adjacent to the respective motors. Elsewhere for convenience of installation, operation, and maintenance special compartments are provided in which are installed the power distribution panels and motor starters. Master controllers for winches and capstans are located at the respective motors; push-buttons and field rheostats for machinery space and galley ventilation fans are located in the spaces served; other push-buttons and field rheostats are, in general, installed in the electric control stations.

For propulsion auxiliary motors special indicators are provided and installed on the main operating level. For each motor a shutter marked "off" and "on" is set manually to show which motors are in use. For each motor there is also provided a green bull's-eye light which shows when it is lighted that the corresponding motor is actually running. Interruption of service is shown immediately by the extinguishing of the bull's-eye light, and the shutter shows which motor has been running so that it can be restarted without investigation of the setting of the valves of the piping system. There is also a similar light indication on top the motor starter.

Emergency Light & Power Plant.

The source of supply for the emergency lighting and power system consists of two 15-kilowatt, 120/-240-volt, 3-wire, direct-current generators each directly connected to a gasoline engine, also a 140-ampere-hour, 24-volt, Type M.Y.A., Exide Iron-Clad storage battery. In addition, there are two batteries each consisting of 11 Type K.X.K.-11 Exide cells and supplying the telephone and call-bell systems, and a 2-cell, Type K.X.K.-7, Exide battery for the electrical thermometer system.

All these batteries are located in a specially designed and ventilated room on the boat deck adjacent to the emergency generator room. In order to facilitate charging, the emergency battery is divided into two sections and charged through resistance from the 230-volt supply. The interior communication batteries and the electric thermometer battery are charged through resistance from the 115 volt supply.

The emergency battery is used primarily as a final reserve for the radio, but its capacity is sufficient to supply also the emergency lights for about one-half hour. Upon failure of the main supply the emergency bus is immediately transferred to the battery by an automatic throw over switch and is automatically returned to the generator supply when the main service is restored or when one or both of the emergency generators are started. A special manually operated switch

ENGINE ROOM AND BELOW-DECK AUXILIARY MOTORS.

Name	No.	Rating	Type
Main Circulating	4	35/115 h.p.,360/600 r.p.m.	Enc. Ventil.
Auxiliary Circulating	2	20/30 h.p., 650/900 r.p.m.	" "
Main Condensate	3	15 h.p., 1200 r.p.m.	" "
Auxiliary Condensate	3	5 h.p., 1750 r.p.m.	" "
Sanitary & Fire	2	30/40 h.p., 1400/1720 r.p.m.	" "
Ballast pump	1	25 h.p., 1150 r.p.m.	" "
Ice water circulating	1	1 1/2 h.p., 1750 r.p.m.	" "
Forced draft blowers	4	2/20 h.p., 410/890 r.p.m.	" "
Steering gear	2	75 h.p., 400 r.p.m.	Enc.Ventil.
Refrigerating Compressor	4	100 h.p., 250/320 r.p.m.	Trip proof.
CO_2 Condenser Circulating	2	5.3/10 h.p., 1030/1150 r.p.m.	Enc.Ventil.
Brine circulating	3	25 h.p.,1650/1750 r.p.m.	" "
Small brine circulating	1	7.5 h.p., 1750 r.p.m.	" "
Shaft turning gear	2	10 h.p., 800 r.p.m.	" "
Main motor ventilation	2	20/40 h.p., 420/740 r.p.m.	" "
Fuel oil service	2	65/11 h.p., 700/1500 r.p.m.	" "
Air compressor	1	85 h.p.	" "

DECK AUXILIARY MOTORS

Name	No.	Rating	Type
Warping capstan	3	75 h.p.,500 r.p.m. Totally encl.	Waterproof
Auto handling capstan	2	15 h.p.,000 r.p.m. Totally encl.	"
Cargo winch	20	35 h.p.,300 r.p.m. Totally encl.	"
Cargo winch	4	25 h.p.,550 r.p.m. Totally encl.	"
Boat winch	2	25 h.p.,550 r.p.m. Totally encl.	"
Boat davit.	6	13.5 h.p. " " "	"

HULL VENTILATING FAN MOTORS

Fan Capacity	No.	Rating	Type
3,000 C.F.M.	1	2.15 h.p.,665/995 r.p.m.	Totally encl.fan cooled
4,000 C.F.M.	10	2.15 h.p.,665/890 r.p.m.	" " " "
6,000 C.F.M.	9	2.15 h.p.,665/990 r.p.m.	" " " "
5,000 C.F.M.	10	2.35 h.p.,693.925 r.p.m.	Totally encl.fan cooled
12,000 C.F.M.	2	4.1 h.p., 610.745 r.p.m.	" " " "
750 C.F.M.	1	0.35 h.p.,1700 r.p.m.	Totally enclosed
3,200 C.F.M.	1	0.3 h.p., 1050 r.p.m.	" "
30,000 C.F.M.	4	9.75 h.p. 335/535 r.p.m.	Totally encl. waterproof
1,860 C.F.M.	1	0.2 h.p. 1425 r.p.m.	Totally enclosed

At left, a complete list of the auxiliary motors on board the Steamship President Hoover.

Below, the main switchboard controlling the power and lighting circuits. Fifty miles of conductors are tributary to this board.

is provided whereby the radio system can be supplied directly from the battery with the remainder of the emergency system dead or supplied from the generators.

Power from this emergency plant is also available for the gyro-compass, running lights, 18-inch searchlight, whistle operator, fire alarm, and water-tight doors. Also in case of necessity the emergency generators may be used for supplying the machine tools, galley equipment, or any other service on the ship up to the limit of their capacity.

There is a total of 50 miles of electric lighting and power cable ranging in size from ¼ inch to 2 inches in diameter and containing a total of 750 miles of copper wire.

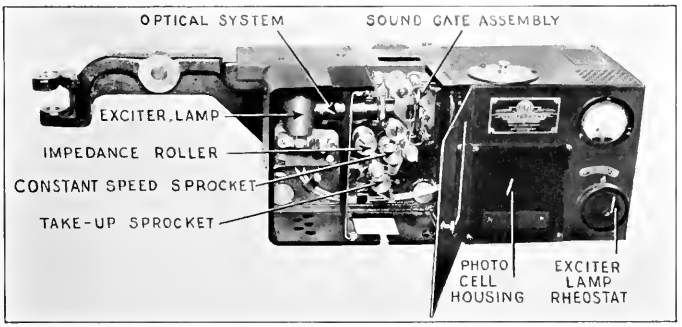
Moving Picture Radio Broadcast Arrangements

A MOVING picture projection room entirely enclosed in steel is provided at the after end of the first class lounge just forward of the lounge lobby and partly under the stairs to the boat deck for the exhibition of motion pictures in the lounge.

In order to raise the projectors above the heads of the audience, the room is fitted with a raised steel floor, about 38 inches above the steel deck and covered with corrugated rubber flooring. An aperture in the steel bulkhead is provided in front of each projector, with a smaller aperture at one side for the operators' use. These openings are arranged to be automatically closed in case of fire by sliding steel shutters which are normally suspended by a cotton string and drop into place when the string is burned away. When not in use, these apertures are concealed behind sliding mirrors in the after end of the lounge, which may be raised or lowered, from inside of the projection room by mechanical operating gear and are arranged to drop into pockets behind the joiner work.

Access to the projection room is provided by means of a metal lined wood door in the joiner paneling and a folding steel step on the outside of the steel enclosure. The room is equipped with two motion picture projectors, photophone with motor generator set; electric phonograph with double turntable; radio motor generator, amplifier, and centralized control panel; and a rewinding bench for motion picture films, thus serving the double purpose of a radio reception and transmission room and a moving picture projection room.

Radio System. An R. C. A. centralized radio system of the latest type is located in the motion picture projection booth just aft of the first class lounge. Provision is made for transmitting radio broadcast reception program or phonograph records to forty loud speakers located in all public spaces including first class, special class, and third class. Speakers are also provided in the suites de luxe, and receptacles for plugging in loud speakers are provided in twenty of the first class staterooms at the forward end of the bridge deck. Speaker outlets are also provided in certain officers' and crew's messrooms and quarters. Orchestra music from the main dining saloon balcony can also be broadcast through all speakers, and through microphones located in the chart room and projection room announcements can be made through all speakers covering every space where passengers are assembled. A special speaker is provided on the sun deck for use at swimming pool or on the games deck.



The R. C. A. photophone sound-movie apparatus as installed on the Steamship President Hoover.

Steering Machinery Control Apparatus Navigation Equipment

EQUIPMENT for the navigation and guidance of the Steamship President Hoover is complete and effective.

Steering Gear. An electro-hydraulic steering engine of American Engineering Company make is installed just forward of the rudder stock on the lower, or No. E, deck. It consists of two pairs of hydraulic cylinders, each pair operating one double plunger. At its center each of these plungers carries a wrist pin connected by steel link rods to the cross head on the rudder stock. These cylinders are served by duplicate Hele-Shaw variable stroke delivery pumps, each capable of driving the hydraulic steerer and each directly connected to a 75-horsepower 230-volt General Electric motor. Automatic follow-up mechanism is installed. Piping between pumps and hydraulic cylinders is all extra heavy steel tubing with brazed flanges and all high pressure valves are of Crane make. Piping and valves are arranged so that either pumping set can be used at will. This complete steering gear is designed with ample power to put the rudder from hard over to hard over (total angle 70 degrees) in 30 seconds with the vessel running 21 knots and with ample strength to stand the pressures and stresses incident to that performance. Five separate controls of this steering engine are arranged on the President Hoover.

1. By A.E.C. hydraulic telemotor from wheel in wheel house on navigating bridge forward.

2. By A.E.C. hydraulic telemotor from wheel on top of wheel house through shafting and gear connection to steering stand in wheel house, arranged so that lower wheel remains stationary while upper wheel is being used.

The enclosed bridge on the Steamship President Hoover featuring magnetic compass, steering stand, Sperry gyro-repeater and gyro-pilot, Rich smoke-detection cabinet, watertight door control, and engine room telegraph.

3. By hand or automatic steering by Sperry gyro-pilot in wheel house.

4. By direct connection from wheel in steering gear room.

5. By shafting and gears from wheel in after steering station on bridge deck.

For emergency steering an auxiliary tiller bolted to the after side of cross-head is operated by manila rope tackle through fairlead sheaves and pipes from the electric capstan on shelter deck aft.

A Sperry electrical, alternating current, rudder indicator with transmitter on the rudder head and indicator in the wheel house keeps the navigating officer informed of the exact position of the rudder in degrees port and starboard.

Magnetic Compasses installed in binnacles of the Navy Standard type and furnished by the John E. Hand & Sons Co. are located at the steering stations on top of and in the wheel house. A binnacle is installed also inside the steering station on the after bridge (A deck), to which the magnetic spirit compass from the wheel house can be transferred for emergency steering when necessary.

Gyroscopic Compass System. A complete Sperry gyroscopic compass system is provided operating on 115-volt circuit, with duplicate motor generators, switchboards, controls, and storage batteries. The master compass is installed in a gyro-compass room conveniently located in the officer's lobby on the boat deck forward so as to be readily accessible from the wheel house. This master compass connects with five repeaters located as follows:

One in wheel house for steering, one in chart room for radio direction finding, one on each bridge wing, and one in the captain's room. The master compass is also connected to a pedestal in the after steering station, on which the repeater compass from the wheel house may be installed for emergency steering from this station.

A Sperry gyro-pilot is also installed in the wheel house for automatic steering under control of the gyroscopic compass system. Gyro-pilot is of the double unit type, with steering unit in the wheel house connected by electric telemotor to the control unit in the steering gear room on the lower (E) deck aft, and operates on 230 volts circuit.

A Sperry course recorder is provided in the chart room in connection with the gyroscopic compass system.

A Kolster radio direction finder is installed in the chart room in connection with the Sperry gyro-repeater.

Fathometer. A Submarine Signal Company Fathometer is provided, which indicates and records the depth of water below the keel of the ship at all times. The indicator cabinet is mounted in the chart room.

Sounding Machine. A Louis Weule Company electric sounding machine is installed on the boat deck just aft of the lighthouse, and a portable sounding boom and leadsman's platform are provided for use with the sounding machine; the boom is of Oergon pine 5 inches in diameter and 30 feet long. The entire installation is arranged to be interchangeable port and starboard.

Clear View Screens. Two Cory-Kent clear view screens, pilot house type, are installed, one port and one starboard, at the forward side of navigating bridge, in the center of the lee window just outside of the wheelhouse.

Searchlights. Two searchlights are installed, one on the bridge arranged for mounting at either side, and one for mounting on the forecastle. The first is an 18-inch Sperry incandescent 1,500,000-candlepower standard projector. The second is a 24-inch Sperry incandescent projector with a divided glass mirror arranged to conform with Suez Canal Regulations, so that the beam may be split to give a 5-degree dark sector. This gives sufficient and safe illumination of both canal banks and at the same time prevents blinding the pilot of an approaching vessel.

Wireless Equipment. The special Dollar Line radio equipment, manufactured by Heintz & Kaufman, Ltd. of San Francisco, for the Steamship President Hoover is installed in a room adjoining the chart room and will keep the vessel in touch with the main office in San Francisco from any part of the seven seas or in touch with any other vessel.

Engine Room Telegraphs. Cory mechanical engine room telegraphs on the bridge transmit engine orders to the control stand in the engine room. This system is in duplicate and was supplied by the Chas. Cory Corporation. There are also mechanical telegraphs on the bridge for docking and clearing orders. There are two steam whistles, one manually controlled, the other fitted with electrical control.

Officers' Telephones. A Henschel telephone system connects each navigation station with the captain's and the chief engineer's rooms, the steering gear room, the engine room, and the other navigation and maneuvering stations. This system was supplied by Chas. J. Henschel Company.

Equipment for Preparation and Service of Meals

Main galley for first and special class service.

THE galley cooking equipment is generally electrical and of the most modern type. All bulkheads enclosing the galley and pantry spaces are built of steel, except that certain rooms adjoining the galley are enclosed with expanded metal on the side toward the galley. No wooden ceiling has been fitted at sides or overhead in any of these spaces.

The galleys for first class and special class passengers are both located in the same room amidship on the upper deck, each having its own battery of electric ranges, with the two batteries installed back to back. A galley scullery, a glass, silver, and china scullery, and a coffee and beverage pantry are provided for each class of service, and the location of these spaces has been carefully worked out so that waiter traffic from each dining saloon is direct and uninterrupted. A bakery, a butcher shop, a grill and larder, a cold pantry, a vegetable room, a bread room, and a daily service meat refrigerator are also provided, each serving both classes of passengers.

In general, all dressers and working tables are of galvanized steel with tops of ash or of rustless Allegheny metal. Space under dressers and tables is fitted up with perforated metal shelves or with metal shelves and lockers. Steam tables have tinned copper pans and Monel metal covers, and outside of steel faced with Monel metal. Sinks are of welded, rust-resisting, Armco iron, galvanized.

Electric Ranges. The electric range for the first class galley is made up of six sections arranged in one battery, and the range for the special class galley is made up of three sections, also in one battery. A similar range, in two sections, is provided in the steerage galley on the shelter deck aft and single electric range sections are installed in separate galleys on the upper deck forward for American and Chinese crew. All ranges are equipped with hood and pan racks and are of marine type with sea rails around the top and guard rails on the outside; they were furnished by the Edison General Electric Appliance Company.

Close-up of the Edison range in first class galley.

Complete Electric Equipment. The auxiliary electrical cooking equipment includes an Edison electric griddle and an Edison electric waffle baker in the first class galley, and an Edison electric griddle, Edison electric egg boiler, two Edison electric broilers, and a Hobart electric mixer in the special class galley. The first class galley scullery is equipped with a Hobart electric food chopper, a Hobart electric cake mixer, a 40-quart Emery Thompson electric ice cream freezer, a Rheinhold electric ice cuber, a Creasy electric ice breaker, and a Davis Engineering Company Paracoil steam generator to supply steam for cooking purposes.

Steam-jacketed, Wearever, aluminum kettles and Horn vegetable steamers are also provided in both the first class and special class galley sculleries and in the galleys for steerage passengers and the crew. The first class coffee and beverage pantry is equipped with Edison electric appliances, including a broiler, egg boiler, griddle, and waffle baker. Stills automatic coffee and hot water urns furnished by the Dohrmann Hotel Supply Company of San Francisco, as well as a chocolate urn and a milk and cream dispenser are also provided for this pantry and for the corresponding space for special class service, which also has a Sunkist juice extractor.

The glass, silver, and china scullery spaces for both classes are equipped with Victor electric dish-washing machines and scrapping tables. A Green Electric Company electric silver buffing machine is provided in the first class glass, silver, and cup pantry. The cold pantry is fitted up with a United States electric meat slicer, a Sunkist electric juice extractor, a United States hand-power bread slicing machine, and a brine-cooled cold counter.

A large hotel type Edison electric broiler, with metal hood above, and a "Home Comfort" charcoal broiler are furnished for the grill and larder. The bakery is fitted up with two Edison electric bake ovens, two steam-proofing ovens, a Read electric dough mixer and other necessary equipment, including a dough trough, marble slab, baker's table, flour rack, and sink.

The butcher shop, which is located adjacent to the daily service meat refrigerator, is equipped with a Hobart electric food-chopper with meat-grinding attachment and a Sharples electric milk and cream emulsifier, in addition to the usual outfit of meat blocks and cutting tables.

The vegetable room has a Hobart electric paring machine, vegetable rack, and cutting table; and the bread room is furnished with a hand-power bread slicer, bread racks, and table. A roll warmer of the Waters-Center Company's Thermotainer type is conveniently located in the waiter's passage to the first class dining saloon.

The galley and pantry spaces are fully equipped with work tables, dressers, and sinks with running hot and cold water. Garbage chutes, flushed with water from the sanitary system for overboard disposal of waste, are provided in the butcher shop, first class galley scullery, glass, silver, and china scullery, and beverage pantry, special class galley scullery, cold pantry, and galleys for American and Chinese crew. Steam rice boilers of large capacity are provided in the galleys for Chinese crew and steerage passengers.

Grill service in connection with the first class smoking room is provided by a beverage room located just forward of this space and equipped with Duparquet combination electric toaster and griddle, Edison electric combination coffee and hot water urn, Sunkist electric juice extractor, and a Frigidaire electric refrigerator. The special class beverage room is located at the after end of the special class smoking room and is provided with a Frigidaire electric bottle cooler.

The mess pantry in connection with the licensed officers' and engineers' mess room on the boat deck is electrically equipped with a Duparquet combination toaster and griddle, an Edison combination coffee and hot water urn, an Edison electric egg boiler, an electric steam table, and a Frigidaire electric refrigerator. The officers' mess room itself is similarly fitted out with an electric egg boiler, combination urn, and steam table. Each of the crew mess rooms, for petty officers, seamen, and firemen, is equipped with coffee and hot water urns of suitable capacity, and a steam table and similar urns are also provided in the steward's mess room, junior engineers' serving pantry, and fireman's lunch.

Built-in refrigerators, each with one to three compartments and all brine-cooled by the ship's cold storage refrigerating system, are provided in the bakery, cold pantry, first class and special class beverage pantries, and crew's serving pantry on the main deck. Small portable ice boxes, made by the Main Manufacturing Company and cooled with ice from the ship's ice-making plant, are furnished for the steerage canteen and the mess rooms for licensed and petty officers, seamen, and firemen.

All steam tables, dressers, working tables, sinks, and built-in refrigerators were made by the shipbuilders in their own shops.

Buff quarry tile, with surface raised in small squares, is laid on cement in the first class and special class galley and pantry spaces on the upper deck and in galleys for third class and steerage passengers and American and Chinese crew.

Fire Detection and Extinguishing Systems

FOR the purpose of preventing fire from working fore and aft in the passenger accommodations, light steel fire-screen bulkheads, provided with hinged metal fireproof doors, are fitted at intervals as required by the London Convention for Safety of Life at Sea.

The fire-screen doors opening out of the first class dining saloon are built with a hollow sheet steel frame glazed with clear fire-resisting plate glass, and enameled to match the finish of the adjoining space. The fire-screen doors opening out of the lobbies on the promenade deck are built with hollow sheet brass frame and panels insulated with sheet asbestos between brass plates, and have brass decorative grille on lobby side. Door frames are finished by the application of a layer of metallic brass sprayed on at welding heat, and later rubbed to the desired texture and lacquered. Grilles are of similar design to those fitted in adjoining passage and elevator doors and are of rolled brass with cast brass ornamentation. Fire screen doors elsewhere are of the usual type, of light steel plate with angle bar frame, and fitted with forged steel hinges and fastenings.

Fire Alarms. All passenger quarters, linen lockers, adjoining storerooms, and similar spaces subject to fires are protected by the Selex thermostatic fire alarm system, with automatic electric supervision, arranged to indicate and give an alarm-bell signal in the wheel house of the presence of fire in any section of the ship so protected. A fire alarm bell is also provided in the engine room. In public spaces and crew's quarters, manual fire alarm stations are provided for turning in an alarm to the central fire detecting station in the wheel house.

The Rich system for fire detection is installed in all cargo holds, including those which are refrigerated, in accordance with the requirements of the United States Steamboat Inspection Service rules. The detecting conduit lines are $\frac{3}{4}$-inch galvanized pipe, led to a detecting cabinet in the wheel house.

Lux carbon dioxide fire-extinguishing system is installed in the boiler room, with distributing pipes below the floor plates and with two hose stations suitably located for fighting fires above the boiler room floor. The distributing system under the boiler room floor is controlled from the engine room near the access door to boiler rooms. The system is of sufficient capacity for properly flooding the under floor space of either boiler room and for supplying the hose stations for a reasonable period without recharging. These alarm, detection, and extinguishing systems were furnished by Walter Kidde & Company, Inc.

Life Saving and Emergency Apparatus

STEAMSHIP President Hoover is equipped throughout with life-saving equipment built by the Welin Davit and Boat Corporation.

The equipment comprises ten life-boats, 32 feet 6 inches length, with capacity for 92 persons each; four life-boats, 28 feet length, with capacity for 60 persons each; two 26-foot lifeboats with capacity for 50 persons each; two 26-foot work-boats with capacity for 35 persons each; and two 28-foot motor life-boats. All are fitted with Steward releasing gear.

The motor lifeboats are equipped with 18-horsepower Palmer gasoline motors fitted with hand starters. All other boats are equipped with masts and sails.

It is interesting to note that the 32-foot 6-inch, 92-person lifeboats actually held 95 persons during the test by the United States Steamboat Inspection Service. These lifeboats are the largest ship's lifeboats ever built in the United States and they contain many unique features. To provide strength they are fitted with steel bulkheads. All the lifeboats are built of heavy gauge copper bearing galvanized sheet steel with a one-piece steel keel and transverse steel floors, upon which the floor boards are secured, and are fitted with removable air tanks and stainless steel water breakers. The garboard strake and the sheer strake are built 20 per cent. heavier than is required by the rules of the United States Steamboat Inspection Service.

The Welin-MacLachlan type of gravity davit fitted on these two steamships was especially designed for them and is absolutely the last word in efficiency. These davits have many unusual features, such as the ease of control. One man alone is all that is required to release the grips and lower any of the lifeboats. As the lifeboats are lowered by gravity, no mechanical or manual force at all is used. The trackways down which the cradle carrying the lifeboat rolls extend below the boat deck to the promenade deck and thereby form very efficient 'tween deck supports. Therefore the gravity davit, instead of setting up stresses as the ordinary mechanical davit does, actually strengthens the ship's superstructure.

Each set of davits is provided with an electric winch, hand and motor controlled, capable of hoisting an empty 92-person boat up the ship's side at a speed of 14 feet per minute, with 7/8-inch diameter, nonspinning steel wire rope falls. The forward winch on each side has its own separate motor, and the other winches are located in pairs with motor between, operating each winch independently through a clutch.

The clearance under these boats is 7 feet, making the cool reaches of the boat deck available as additional promenade space.

Each set of gravity davits is contained within the length of the lifeboat handled, so that it is possible to install a greater number of sets in a given length than with ordinary mechanical davits.

All boats other than the ten 92-person lifeboats, are handled by Welin Quadrant davits. Those on the after island are handled by Welin Quadrant Type LP davits, which are especially designed for handling large nested boats, and each boat is returned to its stowed position by a very efficient Hyde worm-gear winch driven by an electric motor. All motors, controllers, and limit switches were supplied by the General Electric Company.

The emergency lighting circuits on this ship are very complete; and two Buda 15-kilowatt gasoline engine generating sets are ready always to promptly pick up this load and relieve the storage battery in case of failure on the part of the auxiliary power plant.

A very useful and novel application of emergency illumination is the rugged flood light fixtures installed on the underside of the promenade deck overhang to light up the ship's sides and the sea in way of the lifeboats.

Even in the matter of cabin hardware, safety in emergencies was a very prominent factor in deciding the choice of Schlage locks for all stateroom doors. This lock, manufactured in San Francisco, assures absolute privacy by the pressing of a button in the center of the knob on the stateroom side of the door. This action automatically sets an indicator on the outside knob to warn the room maid or steward that passenger is not to be disturbed, and also shuts out the use of the steward's master key. At the same time this lock is panic-proof, since the mere turning of the inside knob, an almost purely instinctive action, immediately releases the lock and opens the door; no misplaced keys or nervous fumbling with keys such as has so often in past emergencies at sea trapped passengers in their rooms.

View on the boat deck showing 92-person Welin lifeboats mounted on Welin-MacLauchlan gravity type davits equipped with winches for raising the boats.

Ship's Laundry

In order to cater to the needs of approximately 900 passengers and the crew (exclusive of steerage passengers), an exceptionally complete equipment of laundry appliances, equal to that of the average commercial laundry on shore and of the most modern character, has been installed.

The laundry is conveniently located on the main deck amidship, between the starboard side of the ship and the boiler casing with a large storage space for soiled linen adjoining forward and a similar room aft for the storage of clean linen. The laundry and linen rooms are enclosed in steel with white enamel finish above a buff wainscott and, in addition to ample light and air through airports in the side of ship, are mechanically ventilated by a complete supply and exhaust system.

Access to the soiled linen room is provided by a hinged steel door, made in halves so that the upper part may be left open for ventilation, and located so that soiled linen may be trucked directly from the storage to the tubs and washing machine. Clean linen is transferred to storage from the ironers and finishing tables through a service window in the forward end of the clean linen room.

The washing machine is of the solid head, two compartment type with monel tub and monel washing cylinder about 36 inches diameter and 64 inches long, and is motor driven. A three-compartment stone tub about 72 inches long, 24 inches wide, and 16 inches deep, with running hot and cold fresh water supply, and a 30-gallon soap tank are installed adjacent to the washer. The drying equipment consists of a 28-inch vertical, underdriven, solid curb extractor and a steam heated super-suction tumbler with a 40x44-inch drying cylinder, both machines being motor driven.

All flatwork is finished on a 75-inch, motor-driven, return-apron ironer, and pieces requiring handwork are ironed on a self-contained ironing board with single electric hand iron equipment. The laundry is furnished with work tables and shelves, and the linen rooms are fitted up with shelving so as to provide the maximum storage space. All laundry appliances were furnished by the American Laundry Machinery Company of New York.

In addition to the regular laundry equipment, a Kny-Scheerer Co., steam disinfecting chamber, about 30x42x84 inches inside, is installed on the bridge deck aft for use in keeping the steerage bedding in a sanitary condition.

Signalling and Communication Systems

In addition to the electrical systems already mentioned, there are, on the Steamship President Hoover, a number of highly important electrical systems of interior signalling and communication for safety and convenience, such as the emergency alarm system, operated by a contact maker in the wheel house; the officers' stateroom telephone system; the pyrometer system in fire rooms; the salinity indicator system for feed water and condensate; the electric repeater for indicating engine room orders in fire rooms; the electric alarm for lubricating oil system; the electric alarm for drainage tank; the temperature indicating system for the refrigerated cargo compartments; the shaft revolution and direction indicator system; the call bell system for staterooms and public rooms; the electric clock system; the fire alarm systems; the wiring of all staterooms for a telephone system to be installed later; and the radio broadcasting system.

The wiring for these systems is of the very best quality, multiple conductor, leaded and armored cables, with single-braided conductor for individual leads, installed to conform with the rules of the United States Steamboat Inspection Service and the various classification societies. There are a total of approximately 47½ miles of single conductor in these various systems.

Cold Storage Spaces and Refrigeration Machinery

The refrigerating machinery is of the carbon dioxide compression brine circulating type and was furnished complete by the Brunswick-Kroeschell Company. It is installed on the tank top in No. 4 hold in the space between the main shafts just aft of the engine room and with direct access thereto. There are four vertical 3-cylinder single-acting, carbon dioxide compressors of such capacity that three of them can maintain during tropical conditions (with sea water at not less than 85 degrees Fahrenheit) the required temperatures in the various cold storage spaces. The fourth machine will be held as a spare unit. Each compressor is direct-connected to a General-Electric motor developing 90 horsepower at 320 revolutions per minute and using direct-current at 230 volts.

Four carbon dioxide condensers are provided, each of sufficient capacity for condensing the gas from one machine when running at full power under normal conditions; but reserve capacity has been provided so that three condensers are capable of condensing the gas from the four machines under emergency conditions. Condensers have cast iron shells and extra heavy copper coils.

There are four brine coolers, each of sufficient capacity for the full normal capacity of one compressor and capable of cooling brine to a temperature of minus 10 degrees Fahrenheit.

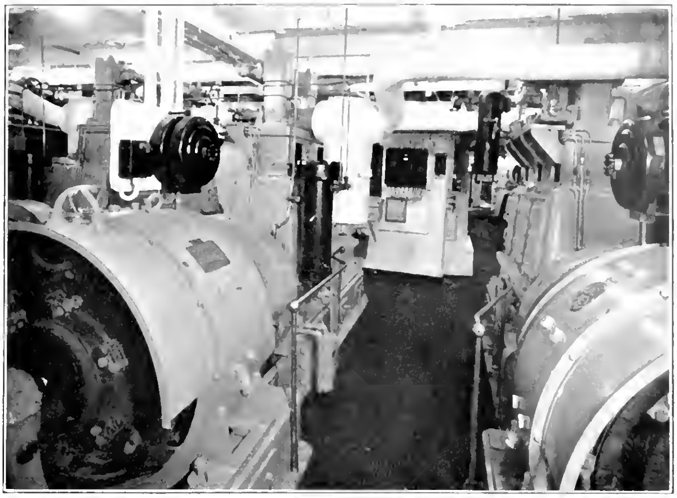
All pumps are motor driven, single-stage double-suction centrifugal pumps made by the Warren Pump Company. There are provided three 3-inch direct-connected, motor-driven brine circulating pumps for circulating brine from the coolers to and from the cooling coils of the refrigerated spaces. Each pump has sufficient capacity to carry half the full refrigeration load when three machines are working at full power, the third pump acting as a spare. Connections have been provided so that any of the pumps can be operated with any of the brine coolers or circuits. A 1½-inch brine circulating pump is installed for circulating brine in the ship's cold storage boxes, with an emergency connection to this system from the main system for use if the small pump should fail. There have been installed two 5-inch direct-connected, motor-driven, cooling water circulating pumps for the carbon dioxide condensers, each of sufficient capacity for the entire load of the four machines when working at full power under emergency conditions. A 1-inch ice water circulating pump is provided for the drinking water system.

In addition to cooling the various refrigerated cargo and ship's cold storage spaces to the temperatures mentioned, the refrigerating plant also performs the duty of making one ton of ice a day and of cooling sufficient drinking water for the passengers and crew in a 150-gallon scuttle butt located in the refrigerated machinery space. The efficiency of the plant is such that, with cooling water at 70 degrees Fahrenheit and the atmosphere at 80 degrees Fahrenheit, the empty refrigerated spaces can be cooled to the lowest range of temperature stated below in twelve hours.

Cold Storage Spaces. The refrigerated cargo spaces on the lower and main decks are arranged for air-cooling frozen or chilled cargo to temperatures varying from 5 to 50 degrees Fahrenheit, and have a total net capacity of about 40,000 cubic feet. The refrigerated cargo space on the orlop deck and the ship's cold storage rooms on the main deck are arranged for brine cooling. This orlop deck cargo space has a total net capacity of about 20,000 cubic feet and may be cooled to temperatures varying from 5 to 40 degrees Fahrenheit for frozen or chilled cargo. The ship's cold storage rooms, including the butcher shop, meat box, and small built-in pantry refrigerators, which are also cooled by the same system, have a total net capacity of about 21,000 cubic feet; and the various rooms may be cooled to temperatures ranging from 50 degrees Fahrenheit for fruits and vegetables down to 12 degrees Fahrenheit for the ice-cream room, which provides storage for 6000 quart bricks.

The air cooled refrigerated cargo spaces are served by an American Blower Company "Sirocco" fan in each room, mounted overhead in an air duct and driven by a Westinghouse motor installed under the beams in the working passage. This fan discharges air over cooling coils in an overhead duct across one end of the room and into a longitudinal duct at the side of the room, from which it is discharged through openings in the sides and bottom of a shallow apron duct covering the entire wall of the room. Exhaust air is drawn off through a similar apron along the opposite side of the room, and returns through an overhead duct to the fan.

The brine-cooled refrigerated cargo space on the orlop deck is arranged similarly to the air-cooled space on the lower deck, but is not equipped with fans, air ducts, or aprons. Cooling coils are mounted on the walls and overhead in all brine-cooled cargo spaces and on the walls only in certain of the ship's cold storage spaces.



The refrigeration machinery compartment showing three of the four vertical 3-cylinder Brunswick-Kroeschell carbon dioxide compressors and their 90-horsepower General-Electric motors.

It is worthy of note that in order to provide for carrying either chilled or frozen cargo, a widely different temperature being required in each case, two separate brine systems, complete with evaporators, condensers, brine pumps, supply headers, and return tanks, are provided, one for low temperature brine and the other for brine at a higher temperature, but so piped that all the units may be thrown into either system. The cooling coils in the refrigerated cargo spaces (both air-cooled and brine-cooled) may be supplied with either low or high temperature brine, depending on whether frozen or chilled cargo is being carried. The ship's cold storage cooling coils are supplied with low temperature brine only.

All brine cooling coils were furnished by the Brunswick-Kroeschell Company; and more than 5½ miles of galvanized pipe, of 1 to 1½ inches in diameter, were used in making up these coils. All air ducts, aprons, ports, dampers, air cooling chambers, insulation, and woodwork generally, and all coil supports, brine valves, fittings, and piping were furnished by the Newport News Shipbuilding & Dry Dock Company. Brine thermometers were supplied by the C. J. Tagliabue Co.; and the electric distant reading thermometers for the cold storage rooms were furnished by Leeds and Northrup.

Coverings for Steel Decks

THE steel decks throughout passenger and crew's accommodations on the Steamship President Hoover are covered generally with Asbestolith flooring furnished and laid by the Asbestolith Manufacturing Co. In first class and special class passenger accommodations, the flooring is laid with an unfinished surface as a base for rubber tile or carpet; elsewhere it is laid with a smooth hard surface to form the finished floor.

Finished Asbestolith is laid in the following spaces: first class and special class main entrance vestibules; third class staterooms, public spaces, and passages; permanent steerage quarters over after peak; officers' and crew's accommodations, except the captain's quarters; service spaces outside of main galleys and pantries; all doctor's spaces; special class and crew's barber shops; special class pursers' office, ship's office, sea post office, and print shop and dark room.

Rubber tiling furnished by The Goodyear Tile & Rubber Company is laid on unfinished Asbestolith flooring and cemented in place, in the following spaces: All first class and special class lobbies, passages, and alcoves; first class dining saloon and smoking room; all special class public spaces;

verandas in de luxe suites; gymnasium, children's play room, soda fountain room, first class barber shop, beauty parlor, novelty shop, first class purser's office, musician's gallery, and coat rooms. Similar rubber tile is laid on a hardwood finished floor over the subfloor in passenger elevator cars. Rubber flooring furnished by the same makers is laid on the treads, risers, and landings of all inside passenger stairs in first class and special class accommodations (except stairs to first class dining saloon), and of stairs to chart room. Rubber tiling in public spaces is laid in strikingly novel patterns, using unusually large blocks of rubber in modern designs in keeping with the interior decoration of the ship.

All rubber tiling was laid by J. W. Davis of Newport News, Virginia.

Carpet is laid on unfinished Asbestolith in the following spaces: All first class and special class staterooms and suites (except suite verandas); first class library and writing room; and captain's stateroom and office. The stairs to the first class dining saloon are covered with carpet with the margins left exposed so as to show the walnut finish of the stairs.

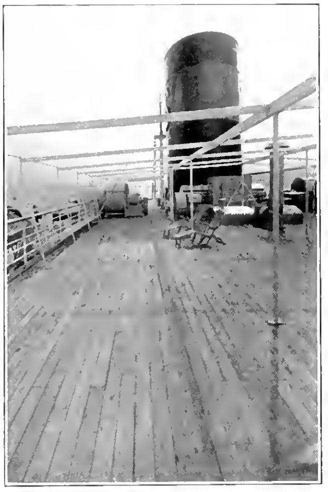
A finished wooden floor is laid over unfinished Asbestolith in the first class lounge and covered with carpet. The central portion of this floor is finished for dancing and is laid in parquet design of teak, maple, walnut, and two shades of oak; elsewhere the floor is of edge-grained pine.

A caulked teak deck is laid throughout the veranda cafe, with its surface finished for dancing.

Ventilation Equipment and Air Conditioning

MECHANICAL ventilation by means of supply and exhaust pressure systems is provided for each individual stateroom and toilet space in accommodations for all classes of passengers and in all crew's quarters below the boat deck; it is also provided for the passenger public rooms, all galleys, pantries, and messrooms, and the machinery spaces. To facilitate ventilation of the engine room, a ventilating stack of similar size and appearance to the smoke stack is fitted above this space.

The first class library and the first class lounge are provided with exhaust ventilation by means of propeller-type fans drawing vitiated air through the ceilings and discharging it directly into the open air above. The first class and special class smoking rooms also have exhaust ventilation by means of multivane fans which remove foul air through the ceilings. As all of the above spaces have doors and windows opening on the weather decks, no other fresh air supply is necessary. The first class dining saloon, in addition to exhaust ventilation from the top of the well over this space, has a supply system furnishing abundant fresh air which may be warmed in cold weather by means of Sturtevant steam ventilation heaters installed in the supply ducts under the upper deck. The special class dining saloon also has mechanical fresh air supply, and the vitiated air is drawn off into the galley exhaust system through the service doors and ventilating louvers in the partition bulkhead at the forward side of the dining room.



View on the sun deck showing ventilation blowers grouped around after stack.

All passenger staterooms and lobbies are ventilated by fresh air supply systems, discharging into staterooms through punkah louvers. Supply and exhaust openings in passenger public spaces are fitted with decorative grilles. All toilets, baths, and showers for all passengers and crew are ventilated by exhaust systems, and all quarters for steerage passengers have complete supply and exhaust systems. All crew's quarters below the boat decks are provided with fresh air supply, with exhaust ventilation from all crew's messrooms and elsewhere, as necessary.

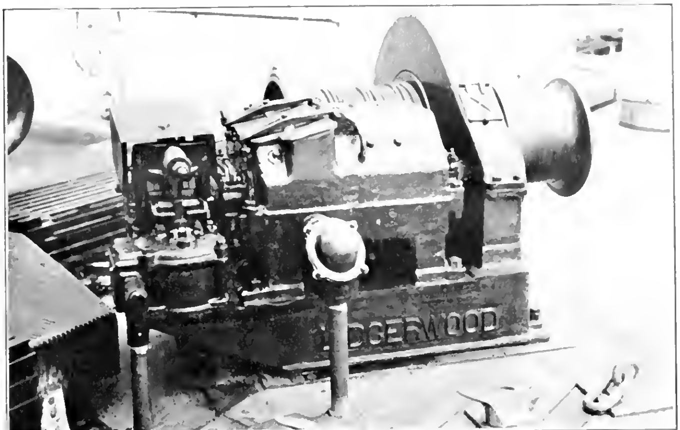
The engine room is supplied with 120,000 cubic feet of fresh air per minute by four Silent-vane fans, and the vitiated air is exhausted into the ventilating stack by mechanical ventilation through the main motor ventilating sets and by natural ventilation through fidley gratings in the sun deck inside that stack.

The main galleys and pantries are provided with fresh air supply and are ventilated by two exhaust systems which draw warm and foul air through hoods over the electric ranges and other cooking equipment. The two Silent-vane galley exhaust fans are installed in the ventilating stack and discharge into it, thus forcing galley odor to the top of the stack, well clear of the passenger decks. One of these galley exhaust systems is so arranged that foul air can be exhausted from refrigerated cargo spaces when desired. The steerage and crew galleys are also ventilated by supply and exhaust systems.

A total of 39 fans are provided for hull ventilation, consisting of 15 of Silent-vane type, 3 of Multivane type, and 3 of propeller type. All fans are located on the weather decks more than half being on the sun deck and most of the others on the bridge deck forward and aft. All ventilation blowers were supplied by B. F. Sturtevant & Company and are driven by General-Electric motors.

In addition to this mechanical exhaust and supply ventilation, there are installed a large number of bracket fans for keeping up air circulation within the various passenger accommodation spaces. Two hundred and ninety-three 12-inch bracket fans are fitted in staterooms and crew's rooms and 75 16-inch fans are installed in public spaces. Each fan and bracket is especially enameled in color to match the bulkhead to which it is fastened.

Equipment for Handling Cargo, Baggage and Stores



Close-up of Lidgerwood single geared, single drum, heavy duty winch.

IN the design and installation of cargo handling gear for the Steamship President Hoover, much thought was given to securing the best composite gear for handling the great variety of cargo that is encountered on the Dollar transpacific and round-the-world services; and, possibly as a direct result of this careful thought, she is the first American steamer on the Pacific with all-electric cargo winches. In all there are 24 cargo winches, all of Lidgerwood manufacture, with General-Electric motors. Of these, 18 are single-geared, single-drum type, with 35-horsepower motors and rated for 3000 pounds at 340 feet a minute on a single line; 4 are double-gear, single-drum type, with a 25-horsepower motor and rated for 3000 pounds at 175 feet a minute; and 2 are reversible, single-drum, compound-geared type, with a high speed rating the same as the 18 single geared type but with a low speed pull of 11,000 pounds for applying purchase through an 8-part tackle for the 30-ton boom topping lift.

Hold No. 1 is served through a central hatch 18 feet square and extending through all decks from orlop to bridge, inclusive. This hatch is trunked between upper and bridge deck and has a hinged, water-tight, steel cover at the bridge deck with wooden hatch boards at all other deck levels. Three 5-ton tubular steel booms on the forward side of the foremast serve this hatch and four single-geared, single-drum winches. The two outside booms are 61 feet long and the central boom is 35 feet long.

Hold No. 2 has a center-line hatch, 20x30 feet, extending from bridge to orlop decks and trunked from bridge to shelter decks. This hatch is served by one 30-ton capacity, 68-foot length, two 5-ton capacity, 36-foot length, and two 5-ton capacity 61-foot 6-inch length tubular or steel booms, all on the after side of the foremast. Two single-drum, single-gear winches and two single-drum, compound winches serve these booms. At this station on the upper deck level there are also installed two Hyde electrical, vertical barrel automobile handling capstans. Between the upper and shelter deck at this space there are four cargo ports, two starboard and two port.

View of the top of the house at the after end of bridge deck showing three of the four cargo winches serving the after cargo hatch. Note power substation erection at the base of the mast for housing control apparatus for winch motors.

For access to No. 3 hold, two 18x19-foot hatches, one port and one starboard, are provided. These extend through orlop, lower, and main decks and are served by four ports (two port and two starboard) between main and upper decks, the ports measuring 8 feet 1 inch by 7 feet 1½ inches. Four 1½-ton cargo cranes, two port and two starboard, are operated by four reversible, single-drum winches.

Hold No. 4 has two 10x10-foot hatches, one port, one starboard, extending through from lower to bridge deck and trunked for their entire heights. For each of these hatches there are two 3-ton capacity booms on the forward side of a king post on the bridge deck. These booms are served by four single-drum winches. Of these booms the two outboard are 51 feet and the two inboard 36 feet long.

The 21x30-foot center-line hatch giving access to Hold No. 5 is fitted with water-tight steel covers at shelter deck level, forming the bottom for the special class swimming pool. At the shelter deck level this hatch is reduced to 16 feet 8 inches by 25 feet, and at bridge deck to 16 feet by 25 feet. Four 5-ton capacity booms on the forward side of the mainmast service this hatch. The outboard booms are 63 feet 6 inches and the inboard booms are 39 feet 6 inches long. Four single-drum winches are installed here.

The gear for No. 6 hold is practically the same as for No. 5 except that the hatch is larger, 19 feet 6 inches by 30 feet through lower, main, upper, shelter, and bridge decks.

There are two main groupings of winches, one at the foremast and one at the mainmast; and a power substation is placed in a special erection at the base of each mast to house the power distributing and control mechanisms for these groups. Each winch motor is provided with full-automatic type control giving rheostatic control hoisting, power lowering when driving down the light line, and dynamic braking when lowering a load. Solenoid type of shoe brakes which operate automatically when the control handle is moved to the "off" position are also provided for holding the load. These brakes also automatically function in case of interruption of the circuit or line disturbance. The acceleration of the load is automatically accomplished in a definite time, which limits the high peak currents, regardless of the manner in which the control handle may be operated by the stevedore. The twenty cargo winches located top-side are of the very latest high speed type and are provided with slow speed motors for reducing the accelerating losses to a minimum.

Wire rope for cargo handling purposes and for guys and standing rigging on masts and king posts was supplied by the Wickwire Spencer Steel Corporation.

Anchor Windlass and Mooring Capstans

STEAMSHIP President Hoover carries two stockless bower anchors weighing 18,900 pounds each, one spare stockless bower anchor of 16,065 pounds weight, and one stockless stream anchor of 6825 pounds weight. These are all of cast steel furnished by the General Steel Castings Company.

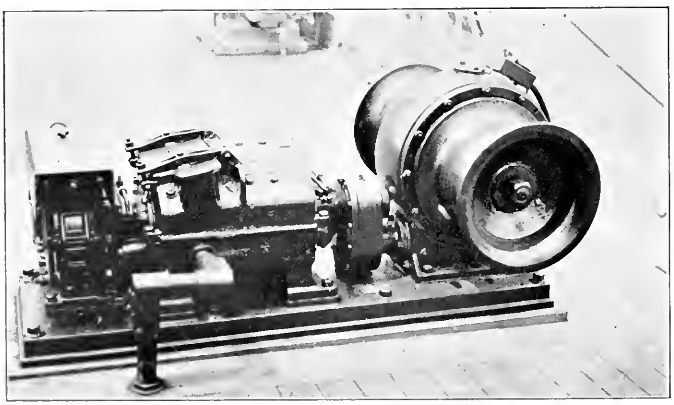
Two lengths of $3\frac{1}{2}$-inch stud-link cast steel chain cable made by the National Malleable & Steel Castings Co. serve the bower anchors. Each length is 165 fathoms, made up of eleven 15-fathom shots joined by shackles. For the stream anchor, 120 fathoms of special flexible steel wire hawser is furnished. This hawser, $5\frac{3}{4}$ inches in circumference and composed of six strands of 24 wires each laid on a hemp center, is carried on a reel at the after end of the bridge deck.

The windlass is of the steam-driven spur-gear type, built by the American Engineering Company with 14x14-inch double cylinder steam engine, windlass and gears mounted on a common bedplate. It is capable of handling the two 18,900-pound bower anchors and their chains at a 30-fathom depth of water with 125 pounds of steam pressure at the throttle. However, all parts subject to steam pressure are designed to take the full boiler pressure of 300 pounds.

Two American Engineering Company steam capstans are installed on the bridge deck forward. These capstans have a 25-inch diameter head and are driven by 10x12-inch reversible steam engines located below on the shelter deck and controlled from the bridge deck. They are suitable for warping with $9\frac{1}{2}$-inch circumference manila hawsers and will withstand the breaking strain of a rope of that size. At a throttle steam pressure of 125 pounds they will exert a pull of 25,000 pounds at 50 feet per minute and at least 2500 pounds at 125 per minute. All parts of the engines are designed to take full boiler pressure.

On the shelter deck aft three American Engineering Company electric capstans are installed, each with a 25-inch diameter head with capstan shaft extending down to its gear and motor on the upper deck. The motor and gearing of each capstan are mounted on one bedplate, and each unit, together with its control mechanism, is installed in a separate compartment. The motors are 75-horsepower at 500 revolutions per minute, 230 volts of General-Electric make, equipped with automatic, shoe-type, solenoid brakes. These electric capstans have the same capacity as the steam capstans described above.

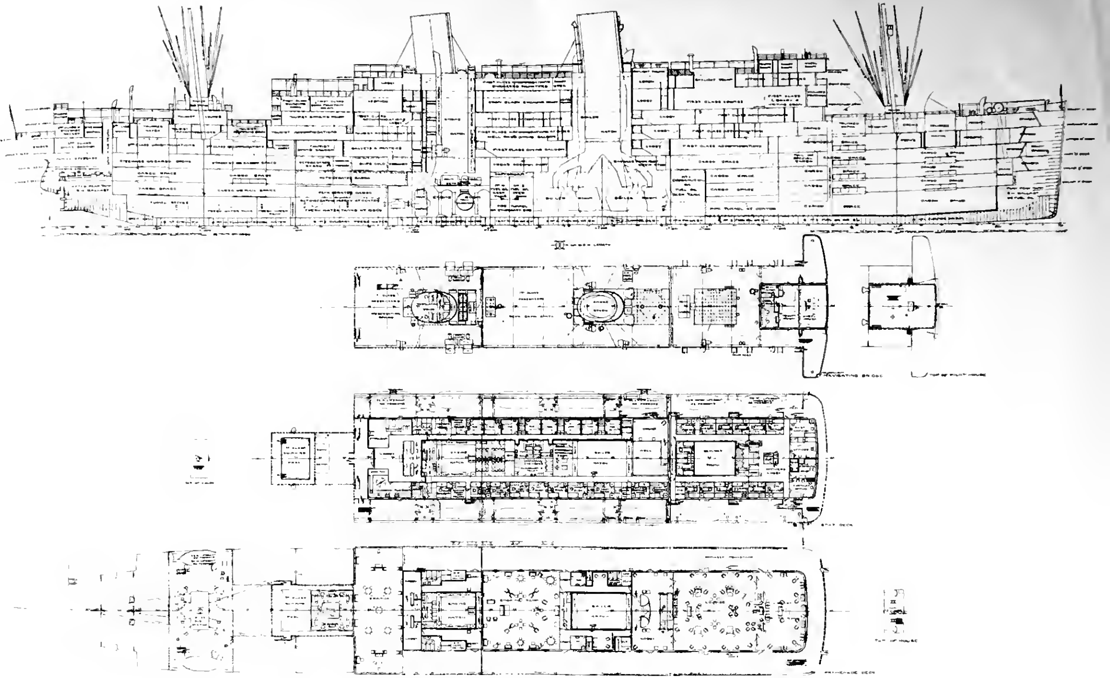
Ample provision of mooring chocks, mooring bitts, and fair leads is made both forward and aft. These are all of Newport News standard pattern. Mooring chocks are of cast steel on structural steel foundation and are fitted with cast iron rollers running on brass bushed steel pins. Mooring bitts are of cast iron, and the steel deck in way of each bitt is heavily reinforced.



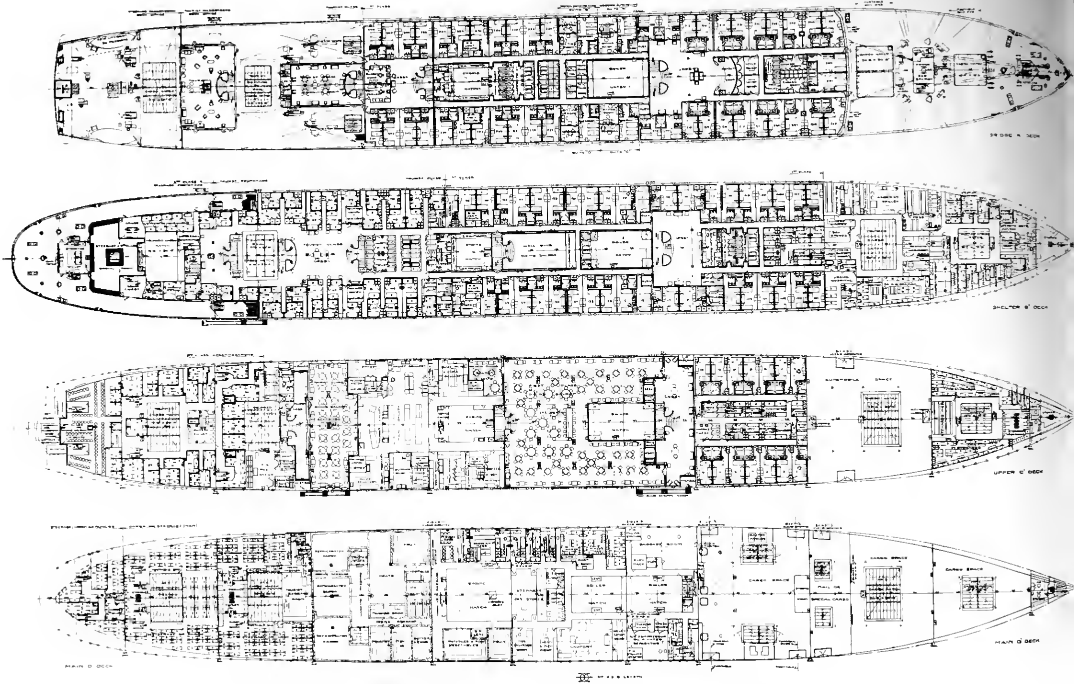
Close-up of the Hyde worm-gear motor-driven winch for handling the four lifeboats on the after island.

Summary

From hawse hole to gudgeon and from keel to truck, Steamship President Hoover, in her design, construction, equipment, and decoration, will present to the world the foremost expression of modern American merchant marine architecture and shipbuilding craft. She represents practically every state in the Union. She is made possible by the will of the American people expressed through Congress in the liberal loan and mail subvention clauses of the Merchant Marine Act, 1928. She will carry the American flag into permanent, worthy competition for the world's maritime transportation business.



Inboard Profile and General Arrangement Plans of Superstructure Decks, Steamship President Hoover



General Arrangement Deck Plans, Steamship President Hoover

Sanitary Piping Systems on Steamship President Hoover

THE Steamship President Hoover is designed for transpacific as well as round-the-world freight and passenger service, calling at ports in Europe, Africa, Asia, the Philippine Islands, and on the east and west coasts of the United States. Such an extended voyage, a large part of it being in very warm climates, requires that the systems shall be capable of operating under wide ranges of temperature for long periods of time, and makes it equally important that the comfort of the passengers should be constantly considered by the designers. With this in mind, particular attention has been paid to the lay-out of all piping systems, both for utilitarian purposes and ease of repairs.

One of the many features of the very extensive plumbing installation is the way in which concealed piping is used without in any way interfering with its accessibility for repairs. A space sufficient for installing supply and drain piping has been left between the steel enclosures of the bathrooms and the surrounding joiner work, and portable panels have been fitted in inconspicuous places to permit of access to the piping. With this arrangement the pipes are led through the sides of the toilet spaces instead of through the floor.

The plumbing systems include separate cold and hot fresh water systems, separate cold and hot salt water systems, and an ice-water circulating system. Branches in all of these systems may be isolated for repairs.

Fresh Water System. The cold fresh water system is drawn from the culinary fresh water tanks, with no other supply connections, by Warren reciprocating pumps and discharged through a $2\frac{1}{2}$-inch Griscom-Russell multiscreen filter and Loomis Manning fresh water filters to a gravity tank located in the ventilating stack. An overflow is kept up at all times from this tank through a pipe led back to the pump suctions and fitted with a sight glass near the pump so that the operators may see that a continuous overflow is maintained. The pumps are also automatically controlled by a governor made by the Atlas Valve Company. Cold fresh water is led through supply mains from the gravity tank to all lavatories and practically all showers (except a few for steerage passengers); to sink faucets, and such equipment as dough mixers, dish-washing machines, and potato peelers in galleys and pantries; and to ice making tanks, feed tank, and brine mixing tanks. An ornamental fountain in the first class lounge lobby is supplied with cold fresh water from a reservoir above, which is kept filled by a special pump connected to the regular cold fresh water system.

Fresh water is heated by coils in a pressure tank in the engine room, temperature being controlled by Sarco temperature regulators fitted in the steam line to the coils. Hot fresh water is led from the tank through mains with branches on the different decks supplying all lavatories in the passenger accommodations and in officers' washrooms, all passengers' and officers' showers, lavatories and other equipment in barber shops, hospitals, and dispensary; sinks in galleys and pantries; and slop sinks in passenger accommodations. Circulation is provided through return lines led from the ends of the mains down to a tank in the engine room, the water level in this tank being maintained by a chronometer valve controlling the steam supply to a Warren reciprocating pump which returns the hot water to the system.

Ice Water System. An ice water circulating system is installed with outlets in the various pantries, service access spaces, and photographic dark room, and a bubbling fountain is provided in the engine room. The ice water is circulated by a motor-driven Warren centrifugal pump with its suction from the scuttle butt which in turn is fed by the cold fresh water system.

Salt Water Systems. Cold salt water is supplied by two motor-driven Warren centrifugal fire and sanitary pumps. A supply connection is also provided from the Warren reciprocating fire and general service pump which may be used in an emergency. These pumps discharge through a common main, fitted with relief valves to avoid excessive pressure, which supplies branches on the various decks. This system is used for flushing all water closets, urinals, slop sinks, garbage chutes, and supplies all bath tubs and both passenger swimming pools.

A pressure tank fitted with steam heating coils is installed in the engine room to provide hot salt water, the temperature of the water being controlled by Sarco temperature regulators fitted in the steam line. The mains from this tank feed branches to all bath tubs and the wash-deck faucets in galley and butcher shop.

Plumbing Drains. Plumbing drains are united into mains which discharge overboard above the load water line except that drains from plumbing and laundry fixtures on the main deck amidships are led to a 300-gallon tank in the boiler room, fitted with two motor driven Yeomans dry pit sewage pumps, operated by float switches and discharging just above the load water line.

Bilge Drainage System. A drainage main is led through the engine, boiler, and refrigerating machinery rooms, shaft alley and forward pipe tunnel, with connections to the suctions of the Warren boiler room bilge, fire and general service and engine room bilge pumps. The boiler room bilge and the bilge and ballast pumps are so arranged that they may discharge overboard direct or through a 45-ton oil and water separator on the main deck. In addition to the drainage system outlined above, one of the main circulating pumps on each side of the ship is fitted with a bilge suction through a nonreturn stop valve.

Ballast System. Provision is made for water ballast in the forward and after peak tanks, inner bottom tanks Nos. 1 to 7, inclusive, and the fuel oil or coconut oil deep tanks and the after athwartship fuel oil deep tanks. The piping is so arranged that any ballast tank may be flooded or pumped overboard and water may be transferred from any tank forward of the engine room to the after peak tank or vice versa. This extensive ballast system permits proper trimming of the ship under any usual service conditions.

Los Angeles Furniture Goes to Sea

Southern California Firm Creates Distinctive Interior Decorative Effects on Seagoing Craft

JUST as the furnishing of every home represents an individual problem—so is it true in the equipping and furnishing of a boat. The same comfort that one enjoys at home must be there—the same distinctive personality must be as apparent as it is in the successful home anywhere. Yet the steps in achieving this complete picture are quite different and require the direction of experts schooled in the knowledge of this particular type of interior decoration.

The Marine Department at Barker Bros., Seventh St., Flower & Figueroa, Los Angeles, has for years executed commissions of this type for some of the most important sportsmen on the Pacific Coast. In many instances the boats have been remodeled under the direction of the experts in this department.

In such cases the designing studio first submits drawings and blue-prints of proposed changes and finally colored sketches of the complete interior furnishing scheme. Thus, the color and furnishing details may be seen before actual decorating begins. Through the designing studio, special furniture may be planned expediently and economically. And through Barker Bros.' factory connections this furniture is produced on a very low cost basis, which in turn is reflected in low prices to the client. Through the tremendous buying power that this firm enjoys, furniture and furnishings of every character are available at low cost.

The scope of Barker Bros.' Marine Department service is very broad. From this source every possible requirement is filled easily, systematically, and economically. The furniture, draperies, floor coverings, all kitchen and dining equipment, linens and bedding—everything for the complete and beautiful furnishing of a boat of any type or size—is supplied through Barker Bros. Thus the execution of a most complicated commission becomes a very simple matter.

Though Barker Bros. have executed many notable and interesting commissions—mention is made of only a few that presented unusual problems and that afforded the opportunity of striking interior plans.

The remodeling and decorating of the Joyita, owned by Ronald West, was completely done by Barker. Bros. Even the paneling and flooring were supplied and installed by them. The built-in pieces in the dining room were specially designed and executed. The carpets, draperies, specially built springs and mattresses—every detail of furnishing—was planned as a unit. Notable indeed was the salon equisitely executed in modern fashion—shell pink, green, and gold serving as the key colors around which the interior decoration scheme and the furnishings were planned.

The Kimiloa, then owned by Captain Melville, presented a very different problem; and Barker Bros.' own informal and colorful Monterey furniture was used throughout. Draperies were of rough textured fabrics; the floor coverings and all accessories were planned to be in harmony with this distinctive type furniture.

The Radio, a craft that enjoys the distinction of having gone with the Macmillan expedition to the north pole, when acquired by Syl Spalding was completely remodeled and refurnished through Barker Bros.' Marine Department. The Invader and, later, the Elia owned by Don Lee were both decorated and furnished completely.

These and many other craft of importance are brilliant examples of the success of an interior decoration commission planned and executed by a firm equipped to handle even the smallest details with efficiency and the greater problems with skill and dispatch. The dovetailing of the various steps facilitates the matter of a harmonized and beautiful ensemble.

An Electrolysis Eliminator

THE phenomenon of electrolysis, with its consequent more or less serious reaction, occurs wherever there is a difference of electric potential between two metal surfaces in the presence of an electrolyte. Since sea water is a good electrolyte, the danger of electrolysis is always present between metals of different potentials at sea. This problem in steel vessels has for many years been more or less adequately taken care of by the use of zinc blocks around the stern of the ship. As practically all machinery and other equipment of a steel vessel, with the exception of the electric equipment, generators, and motors, is grounded to the hull, the electro-positive zinc plates took the majority of the wasting corrosion due to electrolysis upon themselves, and their renewal at more or less frequent intervals would keep corrosion due to electrolysis down to a practical minimum.

On wooden vessels, however, particularly since the introduction of the internal combustion engine, electrolysis has been more severely localized and in some instances it has produced very destructive corrosion, particularly in the way of tail shaft, the stern bearing, the propeller, the rudder, and the shoe. Brass, bronze, or copper intake pipes and outlet pipes for cooling circulatingwater, together with the cast iron frame of the engine cylinders, form a fairly good galvanic battery in connection with sea water. The currents generated in this battery naturally flow in such a manner as to cause wastage of metal in various parts of the ship.

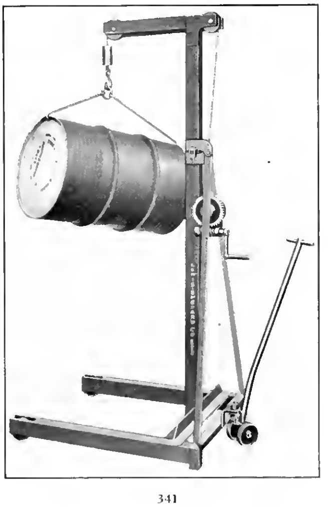
There has recently been designed at Everett Marine Ways, Everett, Washington, a device known as the Marine Electrolysis Eliminator. This consists of a brass casting which is attached to the hull of a ship at a convenient point. On its outer face this casting has a recess in which is held a circular, slightly concave corrugated disk of a very electro-positive alloy. The other side of the casting has a heavy brass rod connection running through to the inside of the ship. From this brass rod a heavy insulated copper wire is run to the engine, the stern bearing, and the stuffing boxes on the propeller shaft, or any other source of electrolytic corrosion.

During the past year some 75 wooden vessels in the Puget Sound region have been equipped with these eliminators, and it is claimed that the results in practically all cases have been complete stoppage of wasting corrosion from this source. In fact, in many cases, the parts of the machinery of these boats which had formerly been very rapidly corroding are now actually being electroplated with the alloy from the Eliminator.

Application has been made for patents, and it is planned to market this device to shipping throughout the world. It is being manufactured by the Marine Electrolysis Eliminator Company of Everett, Wash., of which the Northern California Representative is the Marine Electric Company of San Francisco.

A Handy Portable Crane

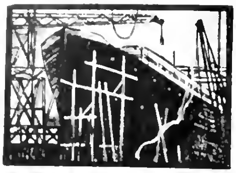
A VERY convenient and efficient lifting device for pier or warehouse is the Lewis Shepard Company's standard portable crane manufactured in capacities from 500 to 2000 pounds for either hand or motor operation or, where required, it can be arranged for gas engine or air motor drive.



This crane is so designed that both the boom and the main upright may be folded down, enabling the crane to go through any doorway and still be used to the full height of rooms. In addition to the simple, hinged type shown in the illustration, the line includes a telescopic type, a revolving, hinged type, and a revolving, telescoping type.

The construction is entirely of structural shapes, welded, and with open end base. Floor and sheave bearings are Hyatt roller. Every point requiring lubrication is fitted with Alemite-Zerk push-type nipples. The worm is self-locking, requiring no brake.

Branch Office Opened.—Chas. J. Henschel & Co., Inc., announces the opening of a branch office at 1600 Arch Street, Philadelphia, Pa. In charge of this office will be L. D. Naudain, electrical engineer, formerly of New York Shipbuilding Company and Marine Engineering Corporation.



American Shipbuilding

Edited by H. C. McKinnon

Three views of the launch of the 632-foot Steamship Mariposa at the Fore River Plant of Bethlehem Shipbuilding Corp., Ltd., Quincey, Massachusetts.

Oceanic Liner Launched. — The new steamship Mariposa building at the Fore River Plant of Bethlehem Shipbuilding Corp., Ltd., Quincy, Massachusetts, for the Oceanic Steamship Company of San Francisco, a subsidiary of the Matson Navigation Company, was successfully launched on July 18. Mrs. Wallace M. Alexander, wife of the vice-president of the Matson Company, was sponsor. This vessel will be ready for delivery early in 1932 and will go into the Oceanic-Matson Line service between San Francisco and Los Angeles harbor and the ports of Auckland, New Zealand, and Sydney, Australia, via Honolulu, Pago Pago, and Samoa.

The Mariposa is the first of three fine new passenger and freight vessels building for the California-South Seas service of the Matson Company under the provisions of the Merchant Marine Act of 1928 and will be one of the finest vessels plying the Pacific. She and her sister ships will have a length of 632 feet, beam of 79 feet, draft of 28 feet. They will be of 26,000 tons displacement and 22,000 tons gross measurement. The propelling machinery will consist of three turbines with single reduction gears and steam will be supplied by 12 water-tube boilers. A total of 22,000 shaft horsepower will drive the vessel, by means of twin screws, at a normal speed of 20½ knots.

This vessel, 630 feet long, was launched into approximately 800 feet of water, the vessel traveling about 140 feet beyond the end of the ways. Checking was accomplished by means of chain drag, approximately 360 tons of chain being used in six piles graduated in weight. A few of the outline particulars are as follows:

1. Launching weight of ship and cradle 12,200 tons.
2. Average declivity of ground ways 9/16 of an inch.
3. Width of ground ways 5 ft.
4. Length of cradle 497½ ft.
5. Initial pressure, tons per sq. in. 2.55 tons.
6. The lower end of the berth on which this vessel was construct-

ed is approximately $2\frac{1}{2}$ feet below mean low water, the water being restrained by a portable gate at the lower end of the berth. The operation of removing the gate commenced at approximately 6:00 A. M. on the morning of the launch, low water being at 8:00 A.M., and the work then on proceeded in an orderly manner until about 1:45 P.M. when the vessel was released from the triggers, immediately starting down the ways and coming to rest at about 140 feet clear of the end of the ground ways.

Successful launching of this vessel represents another achievement in the matter of launching large vessels in restricted water and verifies the calculations made before the launching to a rather remarkable degree.

The accompanying photographs show pictures of the vessel.

Lighthouse Tender Launched. — The Lighthouse tender Columbine, building for the United States Lighthouse Bureau by The Moore Dry Dock Company, Oakland, Calif., was launched on July 23, sponsored by Mrs. H. W. Rhodes, wife of the superintendent for the Eighteenth District at San Francisco.

Keel for the Columbine was laid April 23. She is 112 ft. 2 in. between perpendiculars, 25 ft. molded beam, and is to have diesel-electric propulsion power, machinery being supplied by Atlas-Imperial Diesel Engine Co. and the General Electric Company.

New School Ship Reconditioning Bids.—The U. S. Navy Department, Washington, D. C., will ask for bids from Pacifc Coast shipyards about August 1 for reconditioning the steamship California State, ex-Henry County, to be turned over to the State of California for nautical school purposes. Bids were opened about six weeks ago at San Francisco by the Board of Governors for the Nautical School, but the Navy Department decided the reconditioning work came under its province, and new specifications are being prepared for the work. On the former bids, the General Engineering & Drydock Company submitted low bid of $189,000. The vessel is now laid up at the Mare Island Navy Yard.

Ocean Mail Bids to be Submitted. —The United States Post Office Department, Washington, D.C., will receive bids August 17 for an ocean mail contract over the Gulf-Pacific Line route from Seattle and other Pacific Coast ports to Tampico, Mexico, and other Gulf ports via the Panama Canal. The Gulf-Pacific Line is operated by Swayne & Hoyt, Inc., of San Francisco. Construction of at least one new ship will be required under the mail contract, should it be granted.

View showing the beautifully modeled bow of the Mariposa.

Private Shipyards May Bid on Destroyers. — According to dispatches from Washington, D. C. private shipyards are to have an opportunity to bid on the work of building some of the ten new destroyers for the Navy Department which will be started during the present fiscal year. Specifications will be sent to interested private yards and to certain navy yards, including those at Brooklyn, Boston, Charleston, S. C., Mare Island, and Bremerton.

Plans for these destroyers, which are the first post-war destroyers to be built by the United States Navy, call for ships of London Treaty limits capable of making 35 knots. The estimated cost is $4,700,000 each, and an initial $10,000,000 was appropriated at the last Session of The Congress to start this program. According to reports current on the Pacific Coast, an attempt will be made to bring some of this work to private yards capable of handling the construction on this Coast. The Union Plant of Bethlehem Shipbuilding Corp. at San Francisco is said to be interested. George Armes, president and manager of the General Engineering & Drydock Company of Oakland and of the Los Angeles Shipbuilding & Drydock Company, San Pedro, has indicated that he is interested, and either of his yards is capable of handling this type of ship construction.

Northwest Diesel Finding Markets.—Three sizable orders for the Johnson-Stroud diesel engines, built by the Johnson Engineering Company of Seattle are reported by Eric Johnson, president of the Company. One is a 120-horsepower, 2-cycle, 4-cylinder job for the purse seiner George A and is equipped for pilot house control. The second is for Mrs. Anna Ancich, a replacement job, also a 120-horsepower model. The latest order is for a 180-horsepower, 4-cylinder, heavy duty diesel to turn 360 revolutions per minute, and for the account of A. G. Griswold of Seattle for use in his new 80 by 16 by 6 ft. yacht, now building on Lake Union.

Supply Vessel to be Built.— H. C. Hanson, Seattle naval architect, has completed plans and called for bids on a 37 by 10 by 6.7 ft. patrol ship for the United States Biological Survey, Alaska Division, to be powered with a 100-horsepower Lathrop engine. The Berg Shipbuilding Company of Seattle was the lowest bidder for the boat.

Tug Converted to Diesel Power.— The Atlas-Imperial Diesel Engine Co. has recently shipped several engines to the Pacific Northwest.

The converted tug Gwylan, of the American Towboat Company of Everett, had a new 200-horsepower, 6-cylinder, direct-reversing Atlas-Imperial diesel installed in June, and the tug and fish carrier Rodda had a 170-horsepower, 3-cylinder Atlas diesel installed.

Three new seine boats built at the Barbee Shipbuilding and Drydock Company, Seattle, for Rudolph Franalovich of Anacortes, and Haakon Thompson, each had a 75-horsepower, Atlas installed, and the fisher Westland was converted to

Two workboats recently launched on the Pacific Coast.
At the left is the 135-foot tuna fishing vessel Mayflower ready for launching at the San Diego yard of the Campbell Machine Works. This fine vessel is powered by Union diesel engines and will be completely described in the September issue.
At right is the quarantine boarding launch for the U. S. Public Health Service at San Diego immediately after launching at the General Engineering & Drydock Co., Oakland.

diesel drive with a 4-cylinder, 90-horsepower Atlas for Emmett Ross. The seiner, Twin, another conversion job, had a 70-horsepower, 4-cylinder engine installed.

Building Seiner.—J. M. Martinac Shipbuilding Company of Tacoma was awarded the contract June 19 for construction of an 81 by 20 by 9.6 ft. combination sardine fishing and purse seiner and tuna boat for a Los Angeles syndicate, to be powered with a 230-horsepower Atlas-Imperial 6-cylinder diesel. Gear driven deck machinery will be fitted.

Large Tuna Fisher Completed.—The Harbor Boat Building Co., San Pedro, Calif., recently completed the construction of the $110,000 diesel powered tuna fishing vessel Olympic for John Zuanich and Tony Zankichi of San Pedro. The craft is 125 ft. long and is powered by a 550 horsepower Western-Enterprise diesel engine. She is of the raised deck type and has a refrigerated capacity for fish of 200 tons. Two auxiliary diesel engines furnish motive power for refrigeration plant and other auxiliary machinery. She has a cruising radius of 8000 miles, almost a necessity these days when the tuna fishermen cruise as far south as Panama for their catches. The Olympic is one of the finest vessels of her type ever turned out of a San Pedro yard.

This yard is also completing an 87-ft. power yacht, the Holiday, for Arthur Morris of Los Angeles and has many other jobs on hand for small pleasure power and sail craft.

New Cruisers to be Repaired.—Five new cruisers built for the United States Navy by various navy yards and private shipyards have developed defects in the sternposts and these will have to be replaced. The work will probably all be done in eastern yards.

These particular cruisers are also said to roll so sharply in rough water as to interfere with effective gunfire, and alterations will be made to two of them—the Pensacola and Northampton—at the New York and Norfolk Navy Yards in an attempt to overcome this roll. Antirolling tanks and larger bilge keels will be installed, and the effectiveness of these changes will be thoroughly tested before any of the other cruisers are altered.

Construction experts of the Navy Department point out that the short jerky roll is the result of efforts to produce highly stable ships by placing the center of gravity at a very low point.

Study of the construction of the five cruisers whose sternposts have cracked has not yet revealed whether the defect is due to a fault in ship design or to bad castings.

Yard Reconditions Tanker. — Bethlehem Shipbuilding Corp., Baltimore, Maryland, is rebuilding the tanker Paco from a bulk oil carrier to a combination oil and general cargo carrier. The vessel was recently purchased by Procter & Gamble, soap manufacturers, from the Pennsylvania Steamship Company.

Rejects Bids on Diesel Engines.—According to an announcement made recently by Rear Admiral S. M. Robinson, Chief of the Bureau of Engineering, United States Navy, the department has been forced to reject all bids received from American manufacturers of diesel engines for experimental engines. These bids were submitted June 12 by engine manufacturers under special specifications calling for a light weight, high speed diesel engine suitable for installation in a submarine. The idea of the Navy Department is that an engine of domestic manufacture might be developed suitable for submarine work. Lack of funds to carry out the experimental work is given as the reason for rejecting bids. It is quite possible that the Secretary of the Navy will ask an appropriation of two or three million dollars from the next Congress to carry on research in an attempt to develop a compression-ignition diesel engine of domestic manufacture which will be suitable for surface and submarine vessels, and for the purchase of latest design foreign engines for experimentation.

Sale Agreement for American Diamond Line.—Sale by the United States Shipping Board to the Black Diamond Steamship Corp., of New York, of the American Diamond Line has been confirmed. This fleet consists of twelve cargo vessels—the Ala, Ambridge, City of Alton, Coahoma County, Innoko, Sacandaga, Sac City, Saco, Tomalva, West Arrow, West Eldara, and Wytheville. The contract provides a mail subvention and also requires the purchasers to make certain betterments to the fleet, including the increase in speed of five of the freighters from 10 to 13 knots and the construction of five new 16-knot vessels over a period of ten years, the first vessel to be completed the third year of the contract. The sale price under these terms is $16.25 a ton. The vessels are to operate to Antwerp and Rotterdam out of New York and other Atlantic Coast ports. It is estimated the shipbuilding program will involve an expenditure of $5,000,000 during the next ten years.

Three Self-Propelled Barges for New York.—According to reports from New York, Cox & Stevens, 521 Fifth Avenue, have prepared preliminary plans and specifications for three self-propelled sludge vessels to be used by the Department of Sanitation of the City of New York. The vessels are to be 250 ft. long, powered by two 650-horsepower diesel engines operating twin screws. The contract for the work will not be awarded for some time.

Warships to be Steam Engine Powered.—Steam turbine machinery has been decided upon for installation in the reconditioned battleships New Mexico, Idaho, and Mississippi, and bids were opened June 16 ranging in price from $1,000,420 to $2,128,266. Bids were submitted by the following companies: Bethlehem Shipbuilding Corp., Ltd., Westinghouse Electric & Manufacturing Co., New York Shipbuilding Co., De Laval Steam Turbine Co., Capstaff-Hunter Turbine Works, Inc., and General Electric Company. The New Mexico is now at the Philadelphia navy yard and the Mississippi at the Norfolk navy yard. The Idaho will report to the latter yard for reconditioning about October 1.

Six Liners to be Launched this Fall.—The six passenger and refrigerated freight vessels for the United Mail Steamship Company (subsidiary of the United Fruit Co. of Boston) will be launched this fall. Three of these vessels are under construction at the Fore River Plant of the Bethlehem Shipbuilding Corp. They are the Antigua, to be launched October 25, the Quirigua, to be launched November 14, and the Veragua, scheduled for launching December 12. The other three, building by the Newport News Shipbuilding & Dry Dock Co., are the Segovia and Talamanca scheduled for launching August 15, and the Chiriqui, to be launched in December of this year.

Three of these vessels are for the California - Central American service and three for the New York-Carribean service of the company. They are identical in design, being 446 ft. over-all, 60 ft. beam, 24 ft. loaded draft, 10,940 tons displacement. They will be powered by turbo-electric propulsion machinery developing 10,500 indicated horsepower and driving the vessels at a speed of 17½ knots.

Passenger accommodations in these vessels will be designed and equipped for comfortable travel in the tropics—and the introduction of these fine vessels into their respective services will mark an important step forward in travel accommodations to Central American and Carribean ports.

Converted Vessels Enter Atlantic Trade.—The Baltimore Mail Steamship Company, Baltimore, Maryland, has under way a program of reconditioning five vessels for service from Baltimore to German and French ports, and the first of these to enter service is the City of Baltimore, which sailed for Hamburg and Havre July 2. These five vessels were purchased from the Shipping Board and were named Independence, Victorius, Archer, Eclipse, and Invincible. They have been renamed City of Baltimore, City of Norfolk, City of Newport News, City of Havre, and City of Hamburg.

The work of reconditioning is being done by the Federal Shipbuilding & Dry Dock Company, Kearny, N. J. The vessels were lengthened from 440 ft. 1½ in. between perpendiculars to 486 ft. 7½ in. They are of 56 ft. molded beam and 24 ft. draft. A new raked bow and new stern were fitted and accommodations for 81 passengers were installed. New propelling machinery was installed consisting of a De Laval compound steam turbine with double reduction gear developing normal shaft horsepower of 9500 at 95 revolutions per minute and driving the vessel at a speed of 16 knots. Steam is supplied by four Babcock & Wilcox water-tube boilers.

Trade Literature

Port and Terminal Charges.—The Bureau of Operations of the U.S. Shipping Board and the Board of Engineers for Rivers and Harbors of the War Department have just published their annual volume on "Port and Terminal Charges at United States Ports." The wide scope of the work and the detailed way in which the subject is treated make it a standard book of reference for those in the shipping world who require authentic information respecting port dues and charges.

New Radiobeacon Chart.—A new radiobeacon chart, showing at a glance the location of every radiobeacon on the Atlantic and Gulf coasts, giving the sending period of each station and its distinguishing characteristic, has been prepared by the Lighthouse Service of the Department of Commerce and is now ready for distribution. Such charts are intended for posting in the pilot houses of vessels using radiocompasses in navigation. The new chart, which is a revision of one issued some time ago, shows many changes and improvements in the United States radiobeacon system.

The Cooper-Bessemer Corporation, Mt. Vernon, Ohio, is distributing a folder which contains illustrations and specifications of the new stationary Type JT diesel engine. Bore is 11½ inches, stroke 15 inches. Cylinders are 3, 4, 6, or 8 in number. Rated horsepowers are 150-180; 200-240; 300-360; 400-480 when operating within the speed range of 300-360 r.p.m., with cast-iron pistons. Although fuel economy, trim lines, enclosure, accessibility, and option of built-in accessories are emphasized points — the most noticeable innovation is the placing of the spray valves and driving levers in a position directly below the cam shaft, easily reached from the engine platform. Removal of the engine head can thus be accomplished without disturbing the fuel injection system. Copies of the folder can be secured by addressing this magazine.

Sturtevant Propeller Fan (Catalog No. 385) has just been issued by the B. F. Sturtevant Company, Hyde Park, Boston, Mass. This book covers a new line of propeller fans, which, judging from the pictures, are remarkably well made. They are made of pressed steel throughout with parts welded; and motors are of the ball-bearing type. The catalog gives a complete explanation of the possible uses of this fan. Copies are available gratis.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of July 1, 1931

Pacific Coast

ALBINA ENGINE & MACHINE WORKS,
28 Albina Avenue, Portland, Oregon

L. P. Hosford, hull 34, tunnel-stern, passenger and freight motorship for Harkins Transportation Co., Portland, Ore.; 160 L.B.P.; 30 beam; 15 mi. speed; Atlas-Imperial diesel eng.; keel 2/10/31; launched 5/13/31; **delivered 6/20/31.**

BERG SHIPBUILDING CO.,
28th Ave., N.W., Seattle, Wn.

Survey vessel for Hawaii for the U. S. Army Engineers Office, San Francisco; 65 x 16; 40 tons displ.; Atlas-Imperial diesel.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Polson Bldg., Seattle, Wn., for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1200 B.H.P. McIntosh & Seymour diesel eng.; 14 knots speed.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30, launched 4/2/31; deliver 7/15/31 est.

Samona II, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft; two 500 H.P. Winton diesel engs.; keel 3/15/31, **launched 6/25/31;** delivery Aug. 31 est.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

W. M. Wightman, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; launched 6/18/31; deliver 7/1/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; launch 7/27/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; launch 8/20/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: stmrs. La Placentia, Cymeric, La Perla, Manulani, Maui, Admiral Dewey, Sonoma, Admiral Peary, J. A. Moffett, U.S.A.T. tug Slocum, m.s. Brunswick, Athelqueen, Zaragosa, U.S.S. Colorado, tugs Sea Prince, E. P. Ripley, Gov. Markham, yacht Talayha, launches San Lucas, fireboat Dennis T. Sullivan, ferry Ramon. Drydock and misc. repairs: Deroche. Pipe repairs: stmr. Tahchee. 8 suction pipes: S P.-Golden Gate Ferries. Disconnect and place engine in alignment: launch Crowley No. 26. One tailshaft: stmr. Curacao. Misc. repairs: stmrs. Mojave, Otokia, Scottish Heather, Dixie Arrow, Pacific Fir, Cricket, China Arrow, Maunganui, Point Gorda, San Jose, President McKinley, Virginia, Saramacca, President Polk, San Mateo, Pennsylvania, m.s. Lio, Trocas, Innaren, launch Ubuyu Maru.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydock, clean, paint: stmr. Navesna (also installed fairing plates on rudder, repaired anchor windlass, overhauled deck telegraph system, misc. boiler repairs, overhauled sea valves, repacked stern gland, renewed misc. rivets in hull), Iowan (caulked and welded misc. rivets, renewed sections of port and stbd. bilge keel), dredge A. MacKenzie (general overhaul), Crowley Barge No. 2 (caulked soft spots and butts, installed graving pieces), stmr. Golden Coast (welded and caulked, engine department repairs), stmr. Panaman (welded misc. rivets and seam, installed steel shoe on rudder post), Wapama (also unshipped rudder, renewed rudder braces and pintles, installed misc. brazing piece in hull, repacked stern glands, misc. repairs), yacht Janidore (renewed zinc plates), tug R. M. Woodward (renewed shell plating and misc. engine repairs), stmr. American (caulked misc. rivets and seams in hull, removed propeller, drew tailshaft, installed spare tailshaft in place of service shaft, removed and replaced propeller blades, repacked stern gland), tug A. H. Payson (misc. deck and engine repairs), W. P. Barge No. 2 (renewed fenders and bulwark stanchions), stmr. Maliko (removed propeller blades, installed and reconditioned one spare propeller blade, weld and caulked misc. rivets in seam and hull, repacked stern glands and overhauled sea valves).

PRINCE RUPERT DRYDOCK & SHIPYARD,
Prince Rupert, B.C.

Docked, cleaned, paint, six stay tubes supplied and renewed, misc. other repairs: Dominion Gov. derrick scow. Docked, cleaned, painted: John Currie pile driver scow. Docked, cleaned, painted, misc. carpenter repairs: dredge Lion. Docked, cleaned, painted, misc. hull and engine work: 13 fishing boats. Misc. hull and engine work not requiring docking: 68 fishing boats. 80 commercial jobs.

U. S. NAVY YARD,
Bremerton, Wn.

Misc. repairs and docking: Nevada, Maryland, Aaron Ward. Misc. repairs: Louisville. Out of commission—being fitted out as school ship for State of New York: Procyon. Misc. repairs incident to operation as district craft: Tatnuck, Mahopac, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten coal barges for own account, 175x26x11 ft.; 5 delivered July/30; **5 delivered 5/31.**

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **9 keels laid; 6 launched.**

BATH IRON WORKS
Bath, Maine

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30; launch 7/18/31 est.; deliver 8/10/31 est.

Seapine, hull 144, twin screw, diesel yacht for Henry J. Gielow, Inc., 25 West 43rd St., New York; 155'2" L.O.A.; 150 L.W.L.; 26 beam; 8'6" draft; 2 Bessemer diesel engs.; 550 B.H.P. ea.; keel 10/6/30; launched 4/30/31; **delivered 6/2/31.**

Halonia, hull 146, diesel-elec. yacht for Chas. E. Thorne, Chicago, 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400-H.P. diesel engs.; keel 1/13/31; launched 5/2/31; sea trials 6/6/31; **delivered 6/15/31.**

Felicia, hull 145, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/30/31; launch 8/1/31 est.; deliver 8/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; **keel 5/1/31;** deliver 11/29/31 est.

Hull 148, same as above; keel 5/6/31; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31; deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; keel 6/15/31 est.; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same

as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; **launched 7/18/31.**

Monterey, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Not named, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.

Not named, hull 1445, sister to above.

Not named, hull 1446, sister to above.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons; **launched 5/5/31.**

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

Island Girl, all-welded steel ferryboat for the Seaboard Air Line; 65 x 22 ft., 120 H.P. Fairbanks-Morse eng.; keel 3/7/31; launched 5/20/31; **delivered 6/25/31.**

One all-welded steel yacht, owner not named; 50 x 13 ft.; diesel eng.; keel 11/30; deliver at Savannah 6/15/31 est.

Repairs: Minor repairs: Lighter.

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam; keel 8/31 est.

Repairs: New tail shaft: John Ericsson.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Lenore, hull 148, wood yacht, for S. L. Avery, Chicago; 91'6" L.B.P.; 15'9" beam; 4'6" loaded draft; 85 D.W.T.; 24 mi. per hour speed; 1000 I.H.P. diesel eng.; keel 4/1/31; launch 7/10/31 est.; deliver 7/18/31 est.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; 22 **delivered.**

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x 11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia.

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hulls 1131-1132, two steel cargo box barges for stock, 120x30x8'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.; **launched 7/2/31.**

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; **keel 6/22/31.**

Not named, hull 122, sister to above.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS.
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 watertube boilers; keel 3/15/31; launched 5/9/31; deliver 7/15/31 est.

Hull 277, sister to above, keel 3/25/31; **launch 5/16/31;** deliver 7/25/31 est.

R. H. Goode, hull 278, tug for Dunbar & Sullivan Dredging Co.; 90 L.B.P.; 24'6" beam; 13 loaded draft; 12 loaded speed; comp. steam eng. 750 I.H.P.; 1 14-ft. Scotch boiler; keel 5/23/31; **launched 6/26/31;** deliver 7/25/31 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

One terminal wharf barge for City of Peoria, Ill.; 230 x 45 x 8 ft.; steel deckhouse 205 ft. long; keel 2/9/31; launched 3/21/31; left yard 5/13/31; **delivered 6/5/31.**

Huckleberry Finn, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launch 7/15/31 est.; deliver 12/21/31 est.

One steel maneuver boat hull for U. S. Engineers Office, Cincinnati; complete with derrick; 75 x 24 x 4'6"; **keel 6/25/31;** launch 7/23/31 est.; deliver 8/15/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

William Dickinson, one twin screw boat for Marquette Cement Co., Chicago; 124x 26x7'; 750 H.P. diesel eng.

One steel, diesel powered tug for U. S. Engineering Office, New Orleans; 65'6"x 17'x7'7½".

Hull 266, dredge for McWilliams Dredging Co., 136x54x9 ft.

Two steam driven, side-wheel, dredges for U.S. Engineer Office, Washington, D.C.

MIDLAND BARGE COMPANY
Midland, Pa.

Five barges for Inland Waterways, Corp., Washington, D.C.; 230 x 45 x 11 ft.; 4 **keels laid; launched.**

Three barges for U.S.A. Engineers, Mobile, Ala.; 100 x 24 x 7 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; launched 3/5/31.

Hull 249, same as above; keel 1/17/31; launched 3/16/31.

Hull 250, dredge for Sternberg Dredging Co., 150x50x7'10" depth; keel 3/12/31; launched 6/3/31.

Not named, hull 253, steamboat hull for Woods Lumber Co.; 110 L.B.P.; 26 beam; 4'8" depth; keel 5/25/31; **launched 6/26/31; delivered 7/2/31.**

Hull 254, derrick hull for Woods Lumber Co.; 82 x 28 x 4 ft.; keel 5/5/31; launched 6/4/31, **delivered 7/2/31.**

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 6/22/31 est.; launch 7/25/31 est.

Hull 256, oil barge for stock; 140 L.B.P.; 26 beam; 8 depth; **keel 6/4/31;** launch 7/10/31 est.

Hull 257, same as above; **keel 6/10/31;** launch 7/20/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; deliver 7/28/31 est.

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 8/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launch 8/31 est.; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 12/31 est.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/31 est.; deliver 5/32 est.

Not named, hull 351, sister to above; keel 9/31 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Excambion, hull 397, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 10/25/30; launched 5/28/31; deliver 7/22/31 est.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers; keel 10/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Richmond, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L B P.; 28 beam; 10'6" loaded draft; 1000 I H P. steam engs; 1 Scotch boiler, 16x12 ft; 160 lbs. wk. press. keel 2/12/31; launched 5/5/31; deliver 7/25/31.

Not named, hull 1053, steel hull and steel superstructure for auto carrying ferryboat for Wilson Line, Inc., Wilmington, Del; 174'7" L B P; 58 beam; 9'3" loaded draft; diesel machinery and other work by owners. **keel 5/26/31;** launch 7/30/31 est.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 271, tug for U. S. Public Health Service; 100 L B P.; 22 beam; 11 ft. loaded draft; 2 230-H P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H P motor; keel 8/1/31 est; launch 12/1/31 est; deliver 7/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.: 13,400 D.W.T.; keel 9/17/30; launch 7/13/31 est; deliver 8/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Daylight, hull 137, single screw diesel oil tanker for Standard Transp. Co.; 480 x 65'9" x 37'; Sun-Doxford diesel eng.; keel 11/13/30; **launched 5/16/31; delivered 6/1/31.**

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 8/1/31 est., deliver 8/15/31 est.

Hull 139, steel oil-tank towing barge for Standard Transp. Co.; 225 x 38 x 10 ft.; keel 3/30/31; **launched 6/24/31; delivered 6/25/31.**

Hull 140, sister to above; keel 4/2/31; **launched 7/1/31; delivered 7/3/31.**

Hulls 141-145 incl., five small barges for Sun Oil Co.; 70 x 19 ft.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Murray Hill, hull 50, stem ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan./31, launched 5/27/31; **delivered 6/8/31.**

Washington Square, hull 51, sister to above; keel Jan./31; launched 5/27/31.

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel 6/23/31 est.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launch 10/1/31 est.; deliver 2/1/32 est.

Not named, hull 798, ferryboat for New York, Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launched 6/1/31; deliver 10/1/31 est.

A. G. & P. Co. No. 10, truss-welded barge for Atlantic Gulf & Pacific Co.; 60 L.B.P.; 20 beam; 6 depth; **keel 5/7/31; launched 6/24/31; delivered 7/3/31.**

A. G. & P. Co. No. 11, sister to above; **keel 5/7/31;** launch and deliver 7/8/31 est.

New Columbia River Ferry

FERRY travel across the 8-mile-wide mouth of the Columbia River, between Astoria, Oregon, and Washington points, has undergone a remarkable increase during the past three years, largely due to the continued opening of new links in the coastal Roosevelt Highway, No. 101. The latest addition to the fleet is the new ferry Tourist No. 3, owned by the North Beach Ferry Company of Astoria, and built in the new Port of Astoria yard of the Astoria Marine Construction Company.

The new ship is 120 by 36 by 11.6 feet over-all and 7.6 feet draft. She was designed by Joseph M. Dyer, Astoria naval architect, who has produced many interesting Columbia River craft and who also is president of the Astoria Marine Construction Company.

The ferry is of unusually heavy wood construction, with frames of Port Orford Cedar 6x12 inches, and with heavy 20x20-inch Fir engine bed framing, 65 feet long.

The ferry has capacity for 35 automobiles and 500 passengers and is luxuriously fitted out for comfort at all times. There is a large glass observation room forward, with Presdwood paneling and mahogany trim, fitted with modern light fixtures, davenports, and easy chairs. Next aft are a large lobby, rest rooms (with tile floors and walls, Standard plumbing fixtures, running ice water for drinking purposes), and a fully enclosed galley and lunch counter aft. A promen-

Observation cabin looking aft, on Astoria Ferry Tourist No. 3.

ade deck, with teakwood flooring runs around the entire deckhouse, while an enclosed upper deck is also available for passengers. On this deck are crew's quarters, lobby, toilet, and shower facilities, as well as lifeboat storage. The automobile deck is enclosed with heavy glass windows.

An 8-cylinder Washington diesel, 475 horsepower, driving a 78-inch Johnson 3-bladed propeller will develop a speed of 13½ miles per hour. A Rix auxiliary air compressor and a 15-horsepower Fabco-Tuxham 1-cylinder diesel driving an 8-kilowatt generator furnishes light for the ship and power for the auxiliaries. An Ideal heating boiler, oil fired, and a Griscom Russell Multiwhirl oil cooler is also provided, as well as a Worthington 4-cylinder auxiliary generator for emergency use and small loads. An Allan Cunningham pneumatic steering gear is provided as well as Goodrich Cutless Rubber bearings for the propeller shaft. A Gould automatic electric water system is installed.

View of Tourist No. 3, passenger and automobile ferryboat recently completed for Columbia River service.

Marine Insurance

Edited by James A. Quinby

Too Much Insurance

The Double Insurance Situation on Coastwise Cargo

ARNOULD says that double insurance takes place when the assured makes two or more insurances on the same subject, the same risk, and the same interest. There is nothing illegal about double insurance unless it is made fraudulently in the attempt to collect twice for a single loss. The law has jealously watched all attempts by the assured to make a profit from a loss under his policy, and if two policies are issued to the same assured, covering the same risks and subject-matter, the law forbids the collection by the assured of more than his actual loss.

> *Seaworthy*
>
> The Alice McGlynn was constructed of tin
> In the summer of seventy-nine.
> So her funnel-stays creaked and her bilges they leaked—
> To the lasting disgrace of the line.
> But a Court (whose sea knowledge was garnered at college)
> Proclaimed her a seaworthy boat,
> And defended his act on the noteworthy fact
> That the vessel continued to float.
>
> The Midsummer Night was a dream of delight
> From her stem to her cruiser-type stern
> And the million she cost was a fortune well lost,
> For her owners had money to burn.
> But a Judge made decree—(he had read of the sea,
> And danced a hornpipe as he laughed)
> "It is plain," said the Court, "that her flagstaff's too short,
> She's a grossly unseaworthy craft." J. A. Q.

There is a sharp distinction between English and American practice in the matter of collecting from underwriters in a case of double insurance. The early English rule provided that where a number of underwriters had subscribed a risk, and the goods were not equal in value to the total sums subscribed, the underwriters should be liable only up to the value of the goods in the order in which they had subscribed. The remaining underwriters were absolved from liability and required to return the premium, deducting ½ per cent.

This system of chronological priority was discarded in England after the decision by Lord Mansfield in Newby vs. Reid, in 1763, and the rateable contribution theory established by that case is now incorporated in Sections 32 and 80 of the Marine Insurance Act of England, and is the modern law of that country as to double insurance.

The effect of the English rule (which is involved in cases where policies provide for English law and usage) is thus summarized by Arnould (Sec. 331).

"In case of over-insurance the different sets of policies are considered as making but one insurance, and are good to the extent of the value of the effects put in risk; the assured can recover on the different policies no more than their value, but he may sue the underwriters on any of the policies, and recover from those he so sues to the full extent of his loss, supposing it to be covered by the policy on which he elects to sue, leaving the underwriters on that policy to recover a rateable sum by way of contribution from the underwriters on the other policy."

American underwriters have consistently refused to follow the later English rule, and have adopted clauses in their policies which bring into effect the priority theory of the early English rule. As to prior insurance, such clauses usually provide

" . . . . . . if the assured shall have made any other insurance upon the premises prior in date to this policy, the assurers shall be answerable only for so much as the amount of such prior insurance may be deficient."

As to subsequent insurance, the provision customarily reads:

"In case of any subsequent insurance, the insurer shall, nevertheless, be answerable for the full extent of the sum subscribed by him without right to claim contribution from subsequent insurers."

The majority of cases of double insurance arise through duplication of effort by the shipper and consignee of goods. Such cases can be easily disposed of upon reference to the applicable principles laid down above. In spite of the strict and exclusive provisions of American policies, many American underwriters have, as between themselves, agreed to divide the loss in cases of nonfraudulent double insurance.

Insurance by Carriers

As long as the picture was complicated only by the shipper and consignee, no serious difficulties arose. Under stress of competition, and to protect shippers who would otherwise be uninsured, shipowners began to provide bill of lading insurance for their patrons. Such insurance is usually evidenced by an open or contract policy, taken out by the carrier with an insurer, under which, by means of declarations based upon notations on the bill of lading, the various shippers become the actual parties insured. The premium is added to the freight rate charged the shipper.

Certain carriers have of late been advertising special delivery services which automatically include insurance with no specific increase in rate. This is, in a sense, bill of lading insurance, but is obtained by the shipper upon his indicating that "Service X" is wanted and by paying the tariff rate for such service.

One result of this type of insurance-included transportation is an enormous increase in the amount of double insurance. On the Harvard, which was lost on Point Arguello in May, numerous instances arose where certain goods were covered by both shipper and consignee. Many instances occurred where, in addition to shipper's or consignee's insurance, or both, the goods also moved under bill of lading coverage, or the so-called "Service X" coverage, or both, which is certainly too much insurance.

In nine cases out of ten these carriers' policies provide that they shall not attach if either prior or subsequent policies cover the goods. There is serious doubt whether a policy bearing such a provision is a compliance with the carrier's promise to furnish insurance under its bill of lading or "Service X" agreement. In any case, such contingent insurance has greatly complicated the coastwise marine picture and has led many observers to believe that M. C. Harrison was right when he contended that a ship and cargo should be insured under a single pool policy.

Stanley Robert Case Settled

THE famous Stanley Robert case, which has been more or less of a "cause celebre" in San Francisco for the past four years, has at last been written off the books of the numerous shipowners and underwriters involved.

The case arose from a collision on the Sacramento River near Pittsburg on July 26, 1927, between a tug and barges owned by the Harbor Tug & Barge Company, and the river steamer Sonoma. As a result of the collision one of the barges dumped her load of heavy steel pipe into the river where it remained for some 24 hours, forming a dangerous hidden obstruction. The lights that were placed upon the obstruction failed to function properly, with the result that the river boat Stanley Robert, coming down stream the following midnight, struck the pipe and was wrecked, with a loss of her entire cargo and three members of her crew.

The ensuing litigation was extremely interesting. The Stanley Robert interests, represented by Messrs. Derby, Sharp, Quinby & Tweedt, filed a libel against the Harbor Tug & Barge Company and the Sonoma. The Harbor Tug & Barge Company, through its attorney, Irving H. Frank, immediately filed a petition for limitation of liability, under which claims were then filed by the Stanley Robert interests and by the representatives of one of the crew members who had lost his life. At the trial in the District Court it was proved that the Harbor Tug & Barge Company had undertaken to place the lights upon the obstruction and that the company's general manager had been personally active in the lighting, which later proved inadequate. The Harbor Tug & Barge Company was accordingly denied limitation of liability, and held liable for the full amount of the loss. The owners and underwriters of the pipe were not parties to the litigation, although the shipowners involved contended that they should have been brought into the picture.

The Harbor Tug & Barge Company, in April of this year, appealed to the Circuit Court of Appeals, and the case was to have been tried in October. The appellants, however, apparently preferred to dispose of the matter without appeal and have recently settled the appeal out of court by paying to the Stanley Robert and death interests the sum of $46,000, which represents approximately 90 per cent. of the recoverable damages, with costs and interest.

The case involves several novel points of law and it was regrettable that no written opinion was handed down by the District Court. On one of these points, however, the Findings of Fact indicate that the bailee of wrecked cargo is under the same duty to mark it as is the owner of a wrecked vessel.

J.A.Q.

P & I Insurer Liable for Legal Expense

AN arbitration award recently handed down in New York (The Miramar, 1931 A.M.C. 984) holds a protection and indemnity underwriter liable for legal costs incurred by the assured in defending actions against the vessel, even though the asserted liability of the vessel exceeds the underwriter's maximum interest.

The Federal Insurance Company issued a policy to the owner of the yacht Miramar, which was later lost at sea with all hands. Actions claiming about $950,000 were brought against the owner. The policy was for $80,000 valued at $80,000 and bore a P & I clause which contained the following provision:

"We will pay the assured such proportion of such sum or sums so paid, or which may be required to indemnify the assured for such loss as our respective subscriptions bear to the policy value of the ship hereby assured. * * * But in no case is this company to be liable for more than the total amount of this policy in consequence of any one disaster. And in case the liability of the assured has been contested with the consent in writing of two-thirds of the underwriters on the ship hereby insured in amount, we will also pay a like proportion of the costs which the insured shall thereby incur or be compelled to pay."

The liability of the assured was contested with the assent of the underwriters, and the costs of the contest paid by the assured, whose death before judgment resulted in the abatement of the actions. The underwriters contended that they should be liable only for an equitable proportion of the costs of defense, since the amount sought by claimants exceeded the insured value. The arbitrator ruled against this contention, and held the insurers liable for full costs, in the following language:

"There is a clear agreement by the insurer to pay the costs incurred if the liability of the assured is contested with the insurer's consent. The word 'liability,' from the nature of things, does not mean actual liability but asserted liability. At the outset, it could not be determined whether the insured is under any liability, nor, if any liability exists, what the amount is. If the defense proves successful, there is never any actual liability. If the defense proves unsuccessful, the liability may or may not exceed the amount of the policy. The contract between the parties cannot be varied as different situations might develop.

The contention of the insurer really requires the policy to be interpreted as if it were an agreement to pay some indeterminate portion of the costs of defense, depending, perhaps, on the outcome. That is imposing a qualification on unqualified language.

The agreement of the insurer to pay the costs of contesting liability was part of the consideration for which the assured paid a premium. The assured is entitled to receive the indemnity for which he paid."

Food for Thought

By J. B. Levison, President, Fireman's Fund Insurance Company

THE recent twenty-fifth anniversary of the San Francisco disaster suggests a comparison of conditions in San Francisco at that time with general business conditions to-day. Every man, woman, and child in San Francisco suffered to some extent from the disaster of 1906. During the present depressed condition a large percentage of the people has suffered. Here, however, the comparison ends.

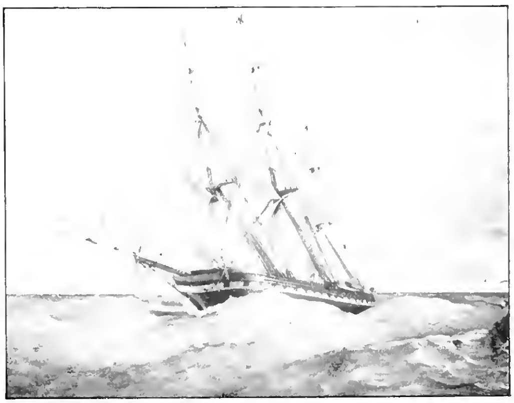
In San Francisco in 1906 we wasted no time bemoaning our fate or discussing our misfortunes with our neighbors. We simply took off our coats, not figuratively but literally speaking, and went to work in the rehabilitation of our personal affairs and the reconstruction of our city.

To-day too much thought and time are spent in regret that we did not sell our stocks at the peak prices and that business is now in such deplorable shape. If all would resolve solemnly to stop this and emulate what was done in San Francisco in 1906, the improvement so earnestly hoped for would certainly come sooner than it otherwise will.

We have not reached the end of all things! In this country, particularly, with its abundance—its overabundance—of crops, with one-half the gold supply of the world in our possession, and the banks actually bulging with money, conditions are bound to improve if we ourselves will only do our share.

In short, with courage, energy, self-confidence, common sense, and aggressive business leadership, a return to normal conditions is inevitable.

(Fireman's Fund Record, July)



Mixed Cargo

We are glad to congratulate both the Fireman's Fund Insurance Compan and Messrs. Frank G. Taylor of Seattle and W. H. Woodruff of Los Angeles, whose promotion to the rank of resident vice-presidents for their respective territories was recently announced. Both men have seen more than twenty years of service with the company in executive positions.

According to data compiled by the Liverpool Underwriters Association, of the 432 marine casualties reported for April 1931, 109 were collisions, 27 due to weather damage, 99 to stranding, 37 to fire, 56 to machinery damage, and 104 miscellaneous causes.

It still looks as if the old human error is the element of navigation that needs attention.

Tommy Green tells me he was up country the other day and ran across a prosperous insurance agent who could neither read nor write.

Greece has passed a law prohibiting the purchase under the Greek flag of passenger steamers over twenty years of age. This would have put a serious crimp in the ship-owning business of Greece just after the war, when over-insurance and scuttling were valuable side lines.

In accord with the suggestion of the San Francisco Chamber of Commerce, and for the purpose of distributing the peak load of city and commuting traffic, the majority of San Francisco insurance offices are now opening at 8:30 A. M. and closing at 4:30 P. M. One of our leading brokerage firms, in a zealous effort to be certain that the traffic would not be congested, has announced to its employees that their daily labors will hereafter commence at 8:30 A. M. and continue till 5:30 P. M.

Now that's really quite humorous—but the employees can't see anything funny about it.

New Marine Agency

Rolph, Landis & Ellis, General Insurance Agents at San Francisco, with branches at Oakland and Los Angeles, have announced the expansion of their already extensive facilities by the establishment of a Marine and Inland Marine Department. This rapidly growing office has just secured the appointment as general agents for the State of California, of the First American Fire Insurance Company for marine and inland marine lines and the representation of the United Firemen's Insurance Company for inland marine and all-risk lines.


Victor H. Winkel, manager, Marine Department, Rolph, Landis, and Ellis.

The First American Fire Insurance Company has assets of about four million dollars with a capital of one million dollars and a surplus to policy holders in excess of two and a half million dollars. It is a member of the America Fore Group headed by the Continental and the Fidelity Phenix Fire Insurance Companies. Its marine operations are handled through the Marine Office of America, an association of a large number of prominent companies with total assets of over three hundred million dollars. This connection affords the general agency unusually large carrying capacity for the writing of all lines of marine and inland marine business, as well as the various forms of aviation coverages.

The United Firemen's Insurance Company is well-known as a member of the Phoenix of London Group and has been represented by the Rolph, Landis & Ellis office for over ten years.

The general agents also announce the appointment of Victor H. Winkel as manager at San Francisco for their Marine and Inland Marine Department. Mr. Winkel is well and favorably known, having commenced his insurance career in the fire branch of the business some eight or ten years ago and later going with the Marine Department of the Insurance Company of North America as underwriter for marine and inland lines at San Francisco. Subsequently he was transferred to Oakland and in his capacity at that point as manager of the North America's east bay office was highly successful as a producer of desirable business.

As is the case with the other lines written by the general agency, no direct business will be handled, but all marine and inland marine policies will be written through the usual brokerage and agency channels.

Trade Notes

Rubber Bearings Specified.—Cutless Rubber Bearings manufactured by the B. F. Goodrich Company are being installed in the following craft:

Two 7-inch bearings in each of two new 130-foot fireboats for the City of New York, now under construction in the Todd Shipyards Corp., New York.

Four bearings—two 8¾-inch and two 8-7/8-inch—are being specified for the ferryboat San Diego, now being built by The Moore Dry Dock Company, Oakland, for the San Diego & Coronado Ferry Company.

Seven 165-foot U. S. Coast Guard patrol boats being built by the Bath Iron Works, Bath, Maine, are being equipped with Cutless Rubber Bearings. The boats are twin screw and each boat will have four rubber bearings, two for 7½-inch shafts and two for 5-inch shafts.

Marine Agent for Northwest.—In order to establish closer relations with their customers in the northern Pacific Coast States, L. W. Ferdinand & Co., of Boston, have appointed Ralston R. Cunningham of Seattle, as their representative. He will have entire charge of the sale of Jeffery's Marine Glue and all other Ferdico products in his territory which are put out by the L. W. Ferdinand & Co.

The marine trade is already very well acquainted with Mr. Cunningham and we know that his many friends will be glad to consult with him regarding marine glues, seam fillers, and water-proof adhesives in general, which constitute the line he will represent for L. W. Ferdinand & Co.

Addition to Marine Equipment Staff.—The Lalor Electric & Engineering Company announces that Richard C. Hawkins has been added to its San Francisco sales and service staff. Hawkins is well known in Pacific Coast shipping circles, having been associated with western marine affairs for twenty years. His previous connections include the Bethlehem Shipbuilding Corporation and the old Pacific Mail Steamship Company. He has recently been identified with shipping in southern California.

Talkies for Ocean Liners.—Ocean-going travelers will have their share of sound motion picture entertainment this summer. Seven of the largest liners afloat and now under construction either have been or will be equipped with RCA Photophone reproducing apparatus. The White Star Liner Olympic has a portable equipment in her main lounge. Similar apparatus is to be installed on the Homeric, and a permanent and a portable unit will be placed on the Majestic. The Brittanic of the same line has had sound apparatus for nearly a year. Three new liners for the Matson Navigation Company of San Francisco each will have two complete units of Photophone's newest model machine, and when the new Dollar Liner steamship President Hoover sails from New York for her home port on August 6 she will carry Photophone sound equipment.

Staff Changes for I. M. M. Co.—At a recent meeting of the board of directors of the International Mercantile Marine Company, A. P. Palmer was elected secretary of the company, to fill the vacancy left by the resignation of Emerson E. Parvin on July 1 because of ill health.

Mr. Palmer has been with the International Mercantile Marine Company since its organization in 1901. He became assistant treasurer in June, 1917, and from May, 1920, held the post of assistant secretary.

Announcement was made at the same time of the election of George W. Cook as comptroller of the company in charge of accounting at all its offices, to succeed the late Alfred R. Marshall.

With the promotion of Mr. Cook, Solfest Tomasson who has been an assistant comptroller with Mr. Cook since 1922 now becomes sole assistant comptroller of the company.

New Works Manager. — The appointment of J. M. Hipple as general works manager for the Westinghouse Electric and Manufacturing Company has been announced by J. S. Tritle, vice-president and general manager. C. H. Champlain, manager of the Westinghouse works at Sharon for the last eight years, succeeds Mr. Hipple as works manager at East Pittsburgh.

Mr. Hipple has been works manager of the East Pittsburgh works since September 1, 1927. He is a native of Jefferson, Ohio, a graduate of Ohio State University, and in 1898 he joined the Westinghouse Company.

Mr. Tritle also announced the appointment of M. L. Fawcett as works manager at Sharon.

A. B. Reynders, in addition to his present duties as works manager at East Springfield, Massachusetts, will have supervision over the operations of the Mansfield works.

J. E. Barkle will have supervision over the Newark works, in addition to his duties as works manager at South Philadelphia.

E. M. Olin, works manager at Mansfield, and H. E. Miller, works manager at Newark, retain their present positions, reporting to Mr. Reynders and Mr. Barkle respectively.

Westinghouse Official Dies. — Truman P. Gaylor, 60, vice president of the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., died suddenly, July 5, in Shelby, Michigan, his boyhood home.

Mr. Gaylord was born in the town where he died. He attended the Allen Academy of Chicago; the University of Michigan, from which he was graduated with the degree of electrical engineer; and Armour Institute of Technology, from which he secured a degree in 1895, and entered the employ of the Westinghouse company in 1899.

Fiftieth Anniversary. — Established in 1881, the Buda Company, manufactured railroad supplies in a modest way at Buda, Illinois, until 1891, when moving to its present location at Harvey, a suburb of Chicago, the business prospered and all of the large railroads and most of the small roads in the United States became, and are to-day, customers, as well as thousands of industrial concerns.

In 1910 the rapid development in the automotive industry appealed to Buda management and this field was entered with a line of high quality gas and gasoline engines for heavy automotive, marine, and industrial application. In 1926 this line was expanded to include the famous Buda-M.A.N. diesel engine.

To-day The Buda Company uses working capital of $7,000,000 and employs 1500 men in shops covering 500,000 square feet of floor space. A substantial export business carries its products to 450 customers in 70 foreign countries.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

In San Francisco bay, aboard Captain G. Allan Hancock's new 195-foot cruiser, Velero III, the California State Nautical School board of governors held its July meeting. "Pacific Marine Review's" news photographer obtained this picture of the Board "en repose" in a cozy haven aboard the cruiser. The board comprises, port to starb'd: Captain C. W. Saunders, Captain L. M. Edelman, John C. Rohlfs, Captain G. Allan Hancock, and Vierling Kersey.

An association has been formed in the State of Washington, with headquarters at Seattle, to be known as the SHIPPING FEDERATION OF WASHINGTON, composed of shipowners, agents, operators, and charterers from the nine port districts of the state. Its purpose is to better the shipping industry, its scope including labor question, legislation, and other shipping problems. FRANK P. FOISIE has been appointed manager. Officers are: HUGH M. DELANTY, president; CAPTAIN HARRY RAMWELL, vice-president; CAPTAIN D. B. WARREN, treasurer; and DEAN BALLARD, secretary. The executive committee is composed of H. A. SHOOK, A. F. HAINES, GEORGE OSGOOD, STANLEY GRIFFITHS, and W. H. PEABODY.

Friends of CAPTAIN JOHNNY O'BRIEN, veteran skipper, dean of Alaska navigators, and one of the most popular skippers on the Pacific Coast, will be sorry to learn of his death on August 4 at Seattle. He had only recently been released from a Seattle hospital apparently in good health.

"Dynamite" Johnny, as he is known, has had his praises sung by such well known authors of Alaska life as Jack London and Rex Beach. He is a true pioneer of the Northland, having gone North with a pack on his back and mushed into the Yukon over the old Teslin trail as early as 1874. During the gold rush of 1898 he was in command of a steamer plying between Seattle and Skagway. The famous skipper is now 83 years old. He was married 53 years ago in Old St. Mary's Church, San Francisco and his wife is still living. It is reported that Captain O'Brien has written his biography which will soon be released by the publishers. He has been engaged for several years as a Puget Sound pilot for the Williams Line, and this news comes through A. F. ZIPF, vice-president of the Williams Line at San Francisco, and a life-long friend.

BERRY E. DUNN, marine sales representative, in San Francisco for the Carrier Engineering Corp., Ltd., of which Brunswick-Kroeschell Co. is a subsidiary, announces that the Carrier organization has taken over the Pacific Ice Machine Company.

This Pacific Coast firm, formerly functioned as representative of Brunswick-Kroeschell.

During July, George C. Ferenz was chief engineer of the Matson liner Matsonia. George is regularly the first assistant engineer.

STEAMSHIP PRESIDENT HOOVER line-up of officers for her maiden voyage from New York to her home port of San Francisco and thence on her maiden voyage transpacific has been announced as follows:

She will be commanded by CAPTAIN FRED E. ANDERSON, former master of the Dollar round-the-world liner President Wilson. MIKE HANNUS will be chief officer.

CHIEF ENGINEER FRANK LITTLEFIELD will be in charge of the engine room. Chief Littlefield has been standing by the President Hoover since long before her launching.

MYRON "JEFF" HOLZER will be in charge of the purser's department. He was lately purser on the President Jackson.

G. M. GORDON, veteran of Pacific Coast passenger liners, has been announced as chief steward of the President Hoover. He formerly served on the President Jefferson.

DR. WILLIAM M. BROWN has been chosen as surgeon for the new liner. He comes from the liner President Jefferson and is well known in shipping circles on both sides of the Atlantic.

Aboard the President Hoover on her trials: Mrs. J. Harold Dollar, Captain Roger Williams, vice-president, Newport News Shipbuilding & Dry Dock Co.; J. Harold Dollar, vice-president, Dollar Lines; Mrs. Keith Ferguson (Mrs. Dollar's sister); and Captain C. A. McAllister, president, American Bureau of Shipping.

A shore leave of several months has been granted CAPTAIN MICHAEL M. JENSEN of the American Mail liner President Lincoln, who has just rounded out 40 years duty as a seafarer. Captain Jensen is a native of Denmark and went to sea as a boy of 15. His first command, more than twenty years ago, was the Bertha operating in the Alaska trade. He commanded successively the Portland, Admiral Sampson, Admiral Evans, Admiral Watson, Admiral Farragut, and Admiral Schley in Alaska and coastwise routes, and the Wheatland Montana, City of Spokane, President Grant, and President Lincoln in transpacific routes.

C. H. CARLANDER, general manager of the Puget Sound Freight Lines, Inc., was recently elected president of the Propeller Club of the United States for the Port of Seattle. JOHN CORMODE, assistant to the vice-president of the American Mail Line, was elected vice- president, and F. P. FOISIE, industrial engineer, was electer secretary. Members of the Board of Governors are: J. T. STEEB, C. B. WARREN, CARL STROUT, GEORGE R. CAREY, and EDWARD CUNNINGHAM.

General Electric Company representatives on the trial trips of the President Hoover, June 7-10, off Rockland, Maine.

Left to right (back row): A. Kennedy, Jr., J. R. Heineman, H. T. McBride, L. D. Anscombe, W. L. R. Emmet, J. M. Crawford, C. F. Scott, Louis Rask, R. W. Wieseman, H. D. Plenge, W. B. Cordes, J. T. Breymaier; (front row): P. H. Knowlton, A. B. Sawyers, H. J. Doell, W. N. Landis, D. L. Burkey, E. H. Van Brunt, W. G. Gardiner, C. O. Dailey, H. C. Rextrew. (Absent from photo); Eskil Berg and B. S. Havens.

Builders' trials of the President Hoover: Here we see Captain Joseph Kemp, pilot; Captain Roger Williams, vice-president, Newport News Shipbuilding & Dry Dock Company; Eskil Berg, General Electric Company; and W. T. Dimm of Newport News. (Names read left to right.)

C. E. RHODES, president of the C. E. Rhodes Company of San Francisco and Los Angeles, announces that JACK BURKE is now a member of the organization. Through widespread experience with packing and machinery problems Burke brings to shipping and industrial firms of Northern California highly valuable and helpful ability as representative of the Rhodes staff. Burke started at sea with the famous old Pacific Mail line, in 1907, under Chief Engineer PAUL ROSSITER on the Korea. He spent several years as engineer with the American-Hawaiian, and later was under the Matson flag. He holds papers as unlimited engineer of steam. Ashore, Burke served as shop foreman and also was foreman in charge of machinery installation for the Moore Shipbuilding plant. During the past fifteen years he has been service and erecting engineer for Worthington Pump and Machinery Corporation.

Packing and machinery expert—our good friend Jack Burke of the C. E. Rhodes Company, San Francisco and Los Angeles.

Veteran San Francisco shipmaster and well known up and down the Pacific Coast, as well as in many offshore ports, CAPTAIN IRVING A. DURKEE, was recently named secretary of the California State Pilot Commission for the Port of San Francisco, succeeding HARRY A. COSGRIFF.

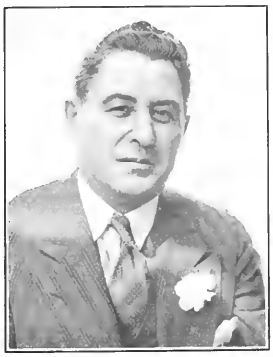
R. F. CULLEN has been appointed general passenger agent in charge of the offshore operations of the Los Angeles Steamship Company, with headquarters at Los Angeles. T. M. COLE has been made general passenger agent in charge of the LASSCO Line's coastwise services, with headquarters at San Francisco.

These two appointments were made by R. J. CHANDLER, vice-president and general manager, to fill the vacancy made by the resignation of ROY V. CROWDER, who left the firm July 1 to become passenger traffic manager of the Panama Mail Line with headquarters in New York.

Of considerable interest to the Pacific Coast shipping fraternity interested in the further development of travel to and from this coast is the announcement by the International Mercantile Marine Company of the appointment of WALTER H. JONES as director of advertising and publicity. Mr. Jones will be in charge of this branch of work for the Panama Pacific Line, White Star, Red Star, and Atlantic Transport lines. He has been with the company for three years and had previous advertising and publicity experience with the New York Telephone Company.

STEPHEN E. HICKS, formerly chief engineer on the Union Oil tanker Caliche, recently was appointed assistant keeper of the Los Angeles Harbor breakwater light to take the place made vacant by the death of Joseph Stark. I. D. CONKLIN is chief lighthouse keeper at this station.

"BILL" FALBUSH, assistant hydrographer of the United States Hydrographic Office at San Francisco, was kept busy July 13 receiving the congratulations of his many friends on the rounding out of 27 years of service with the same office.



William K. "Bill" Ashman's world-wide reputation as major domo of cuisine aboard the great Dollar fleets, is now to reach new heights, for "Bill" is arranging still higher standards for the new liners President Hoover and President Coolidge. By way of relaxing for his added responsibilities, Ashman batted out 97-27-70 net at Union League Links near San Francisco, and thus won a most spacious golf bag, which the waterfront golfing addicts are inspecting with envy and awe. "What-a-man!" say the gang.

Official News *of the* PROPELLER CLUB *of* California

THE Propeller Club of California has made an innovation in its Tuesday luncheon assemblies in the California Room of the Commercial Club at San Francisco. This is a plan of rotating the chairmen for the various educational programs. For instance, the gathering of August 4 found Jim Cronin piloting the gavel. Jim, as we all remember, was originator of the Propeller Club of California which, in an amazingly brief space of time has attained recognition throughout the western range. Here we summarize Propeller Club activities for June, July, and August.

June 30: Captain Leb Curtis, well known Pacific Coast shipmaster, gave us a very interesting talk on "Ship Salvage."

July 7: Professor W. C. Durand, Stanford University, addressed on the subject: "Ships' Propellers". Professor Durand has written several books on this subject and gave some very interesting information.

July 14: Wilson Meyer, Chalmers Graham, Donald Kieffer, and Walter Dawes of the Marine Committee of the San Francisco Junior Chamber of Commerce met with us. These gentlemen are very active on their committee and with their associates are responsible for the splendid success of the Harbor Day celebrations which have been held each August for the past two years. Mr. Graham gave us a very interesting talk outlining in detail plans that are being made for the celebration of 1931 Harbor Day.

July 21: Jim Hines procured a motion picture showing side launching of Captain G. Allan Hancock's new scientific cruiser Velero III. Al Becker, an eminent authority on the subject, gave us his experience with side launchings, both on the Great Lakes and also while acting as general manager of the Shaw-Batcher shipyard, San Francisco. Harry Haviside furnished the projector and also acted as operator. Through the co-operation of these three gentlemen a splendid program was enjoyed by our members.

July 28: Captain Harris, U.S.N., delivered an interesting talk on his experiences in naval activities.

August 4: We had arranged for Captain J. E. Tomb of the New York State Schoolship and the Chief Engineer of the vessel to be with us on this date; however, it is with regret that we have learned that the vessel has been unavoidably delayed at Puget Sound and will not arrive at San Francisco in time for these gentlemen to be our guests at this luncheon. However, we hope to meet them during their stay at San Francisco.

On this day Mr. Edwin H. Walter, one of our members who divides his time between acting as a ship broker and a pilot in the naval air reserves spoke on the subject: "Naval Air Fighting Tactics."

—PC—

New Members:

O. A. Dunkal	Frank De Beneditti
S. A. Livingston	J. A. Matthews

—PC—

Harbor Day: The Propeller Club is again conducting the boat races for Harbor Day, August 26, sponsored by the Junior Chamber of Commerce. The committee is as followers: Captain A. T. Hunter, chairman, Vernon Showell, Captain J. A. Rumsey, Harry Haviside, and Stanley Allen. There will be three contests, merchant marine lifeboat race, sea scout race, and California Schoolship race. The entries in the merchant marine boat race include Matson Navigation Company, American-Hawaiian Steamship Company, Dollar Steamship Line, Panama Mail Steamship Company, Panama Pacific Line, Standard Oil Company, (Calif.).

—PC—

We are glad to advise that Eddie Holland, who has been seriously ill, is now convalescing and will soon be on deck again.

—PC—

Golf: Please check with Russ Pratt, SUtter 6750, chairman of the Golf Committee, for information relative to our Fall Golf Tournament.

JOSEPH F. GISLER, well known marine surveyor and engineer of San Francisco, has recently become associated with PAUL L. JOSLYN, in the expansion of latter's marine survey work. Offices have been established in the Exchange Block, San Francisco, and will engage in the business of surveys, appraisals of hulls and machinery, and have made connections for prompt and efficient salvage service at Monterey, Sacramento River district, as well as the San Francisco Bay district.

FRANKLIN WILLIAM BIEDERT, veteran chief engineer of the American - Hawaiian Steamship Company, will retire from service when the steamship Mexican reaches New York harbor on her present intercoastal run. Chief Biedert completes 38 years of service in the American merchant marine, thirty of them with the American-Hawaiian line, having signed on board the fleet's original ship American sailing from New York, October 30, 1900. He served for 17½ years on the Texan, and was on this vessel during the war when, loaded with nitrate for a French port, she was rammed by her convoying cruiser, the Denver, and had to put back to New York for repairs. Chief Biedert says this is the only serious accident to any ship of the American-Hawaiian fleet while he was aboard. He plans to return to California in October to make his home.

Friends of LEROY E. KUHNS will be glad to know that he has recently been appointed United States Shipping Commissioner at the Port of Portland, Oregon, and now has charge of signing on of crews, enforcement of navigation laws in relation to seamen, decisions of disputes between masters and seamen, and other obligations coming under the head of his new office. Mr. Kuhns was recently identified with the Customs Service at Portland.

Book Reviews

SHIP MANAGEMENT & OPERATOR. By Hobart S. Perry. 6x8 inches; 310 pages; 96 illustrations; cloth; Published by Simmons-Boardman Publishing Co., New York. Price $4.

Hobart S. Perry is assistant professor of Commerce and Transportation, Wharton School of Finance and Commerce, University of Pennsylvania. The book is the "outgrowth of a course" on this subject "given by the author to students majoring in transportation and foreign trade in his department at the University." It is an excellent textbook, probably the first of its kind published in America. It is recommended for use in college courses and for all who desire to begin a specialized study of modern marine transportation.

NICHOLLS SEAMANSHIP AND NAUTICAL KNOWLEDGE for second mates, mates, and masters' examinations. By Charles H. Brown, F.R.S.G.S. 5x7 inches; 584 pages, profusely illustrated; cloth. Published by Brown, Son & Ferguson, Ltd., Glasgow. Price 15 shillings.

This is the Sixteenth Edition of a standard British book on this subject. Its author is superintendent of the School of Navigation, Royal Technical College, Glasgow. The text is full of useful and up-to-date nautical lore, the illustrations and the explanations are clear and lucid. An excellent reference book for the shoreside sailor and a good guide for the British seaman.

OIL TANKERS. By Robert W. Morell, M.E. 6x8 inches; 375 pages, 79 illustrations, cloth. Published by Simmons - Boardman, New York. Price $4.

This second edition of the American standard work on oil tankers has been enlarged and brought up to date, producing a book worthy of the tremendous growth in tanker tonnage during the past few years. Robert W. Morell is a well qualified authority on tankers. Formerly a naval architect with the Standard Shipping Company, and later marine superintendent for the Tide Water Oil Company, he is now a consulting specialist on tanker problems.

SCOOP CIRCULATION. By Lieut.-Comdr. H. A. Gosnell, U.S.N.R. 5x7 inches; 69 pages, 26 illustrations. Published by Simmons-Boardman, New York. Price $2.50.

Those interested in a compact handbook describing and illustrating the standard condenser auxiliaries used by the lighter vessels of the United States Navy will find this little book well worth while. Those interested in specific data and illustrations helpful to scoop design will be very much disappointed. The very considerable volume of recent research into scoop stream-lining and the improvement of scoop circulation thereby is not even mentioned. In fact there is not in this book even one illustration showing any form of scoop.

BUYERS' GUIDE AND MARINE DIRECTORY

Acetylene (Dissolved).
Prest-O-Lite Company.
Aerating Filters.
Griscom-Russell Company.
Air After Coolers.
Ingersoll-Rand Co.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machinery Corporation.
Air Chambers.
Worthington Pump & Machinery Corporation.
Air and Circulating Pumps.
Ingersoll-Rand Co.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machinery Corporation.
Air and Compressor Pumps.
Ingersoll-Rand Co.
Westinghouse Electric Manufacturing Co.
Worthington Pump & Machinery Corporation.
Air Compressors.
General Electric Company.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corporation.
Air Pumps, Vertical Twin Beam.
Worthington Pump & Machinery Corporation.
Air Separators.
Griscom-Russell Company.
Western Engineering Company.
Alarms, Low Water.
Chas. Cory Corporation
The Lunkenheimer Company.
Anchors.
Ford & Geirrine, C. V. Lane.
Anti-Rust Coatings.
L. W. Ferdinand & Company.
Hill-Hubbell & Co.
International Compositions Co.
The Federal Composition & Paint Company, Inc.
Arc Searchlights.
General Electric Company.
Ash Ejectors.
Davis Engineering Corporation.
Western Engineering Company.
Ash Hoists.
Hyde Windlass Co.
Ingersoll-Rand Co.
Average Adjusters.
Johnson & Higgins.
Babbit Metals.
Cramp Brass & Iron Foundries Co.
John Finn Metal Works.
Barges, Salvage and Wrecking.
Haviside Company.
Smith-Rice Company.
Barges, Derricks.
Haviside Company.
Bath Heaters.
Davis Engineering Corporation.
Griscom-Russell Company.
Western Engineering Company.
Batteries.
The Electric Storage Battery Co.
National Battery Company.
Bearings
R. W. Rhoades Metaline Co., Inc.
Beds.
The Simmons Company.
Berths.
The Simmons Company.
Bilge Pumps.
Ingersoll-Rand Co.
The Sperry Gyroscope Co.
Bituminous Primer and Enamels.
Hill-Hubbell & Co.
International Compositions Company.
Blowers.
B. F. Sturtevant Company
Ford & Geirrine, C. V. Lane.
Kearfott Engineering Company.
Westinghouse Electric & Mfg. Co.
Blowers, Turbine and Motor-Driven
Westinghouse Electric & Mfg. Co.
Blowpipes.
Oxweld Acetylene Company.

Boilers.
Almy Water Tube Boiler Co.
Chas. C. Moore & Co., ENGINEERS.
Babcock & Wilcox Co.
Bethlehem S. B. Corp., Ltd.
Griscom-Russell Company.
Todd Drydock Corporation.
Boiler Flue Cleaners.
Griscom-Russell Company.
Boiler Feed Water Regulators.
The Babcock & Wilcox Co.
Davis Engineering Corporation.
Griscom-Russell Company.
Vaughn, G. E. Witt Co.
Western Engineering Company.
Boiler Flue Cutters and Expanders.
Griscom-Russell Company.
Boiler Mountings.
The Lunkenheimer Company.
Boiler Tubes
The Babcock & Wilcox Co.
Ford & Geirrine.
Brass and Bronze Supplies.
The Lunkenheimer Company.
Brick, Insulation
Armstrong Cork & Insulation Co.
Brokers, Custom & Insurance.
Johnson & Higgins.
Bulk-heads.
Haskelite Mfg. Corporation.
The Pantasote Company, Inc.
Burners.
Babcock & Wilcox Co.
Coen Company.
Chas. C. Moore & Co., ENGINEERS.
Ford & Geirrine, C. V. Lane.
W. S. Ray Mfg. Co.
Vaughn, G. E. Witt Co.
Bushings
R. W. Rhoades Metaline Co., Inc.
Bushings and Bearings, Oilless
R. W. Rhoades Metaline Co., Inc.
Calcium Carbide.
Fairbanks, Morse & Company.
Capstans.
Bethlehem Shipbuilding Corp., Ltd.
Dake Engine Company.
Ford & Geirrine, C. V. Lane.
Hyde Windlass Company.
Ingersoll-Rand Co.
Capstans, Winches & Windlasses
Allan Cunningham Co.
Bethlehem Shipbuilding Corp., Ltd.
Ford & Geirrine, C. V. Lane.
Ingersoll-Rand Co.
Western Engineering Co.
Castings.
Cramp Brass & Iron Foundries Co.
Griscom-Russell Company.
Caulking Cotton.
George Stratford Oakum Co.
Ceilings.
Haskelite Mfg. Corporation.
Cement (Linoleum)
Armstrong Cork Company.
L. W. Ferdinand Company.
Cement, Waterproof; Marine, Gasket, Rubber Tile.
L. W. Ferdinand Company.
International Compositions Company
Centrifugal Machines.
De Laval Separator Co.
Sharples Specialty Company.
Chain.
Foard-Barstow Ship Chandlery Co.
Ford & Geirrine, C. V. Lane.
Chain Hoists, Blocks and Cranes.
(See also Cranes and Hoists, Electric.)
Cunningham, Allan.
Dake Engine Company.
Fairbanks, Morse & Company.
Ford & Geirrine, C. V. Lane.
The Yale & Towne Mfg. Co.
Chains, Lubricant.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co.
The Texas Company.
Union Oil Co.

Chandlery.
(See Hardware and Ship Chandlery.)
Chisel Blanks.
Ingersoll-Rand Co.
Chocks.
Ford & Geirrine, C. V. Lane.
Circulating Pumps.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corporation.
Westinghouse Elec. & Mfg. Co.
Clutches—Magnetic.
The Sperry Gyroscope Co.
Coils, Copper Pipe.
Davis Engineering Corporation.
Western Engineering Company.
Compasses, Gyroscopic.
Sperry Gyroscope Company.
Compound Diesel Engines.
The Sperry Gyroscope Co.
Compound Oil Engine Generating Co.
The Sperry Gyroscope Co.
Composition, Paints.
The Federal Composition & Paint Company, Inc.
International Compositions Company.
Compressors, Lubricant.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co.
The Texas Company.
Union Oil Co.
Condensate Pumps.
Ingersoll-Rand Co.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machinery Corporation.
Condensers.
Davis Engineering Corporation.
American Engineering Company.
Bethlehem S. B. Corp., Ltd.
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
Ingersoll-Rand Co.
Vaughn, G. E. Witt Co.
Western Engineering Company.
Westinghouse Electric & Mfg. Co.
Worthington Pump & Machinery Corporation.
Condensation Drainers.
Vaughn, G. E. Witt Co.
Condenser Ferrules.
Kearfott Engineering Company.
Condenser Tubes.
Kearfott Engineering Company.
Coolers.
Davis Engineering Corporation.
Frick Company.
Griscom-Russell Company.
Western Engineering Company.
Cordage
(See Rope.)
Cork Insulation
Armstrong Cork & Insulation Co.
Cork Pipe Covering
Armstrong Cork & Insulation Co.
Cork Tile
Armstrong Cork Company.
Cotton Waste
George Stratford Oakum Co.
Cowls.
(See Ventilator Cowls.)
Cranes, Overhead.
The Yale & Towne Mfg. Co.
Crank Shafts.
(See Forgings.)
Cylinders, Gas.
American Welding Company.
Cutting and Welding.
(See Welding and Cutting.)
Davits.
Ford & Geirrine, C. V. Lane.
Steward Davit & Equipm't Corp.
Decking.
Wailes Dove-Hermiston Corporation.
Dies.
Geo. F. Marchant Company.
Die Blocks (for Drop Forgings).
American Steel Foundries.
Dies (Compression Riveter).
Geo. F. Marchant Company.

Dies (Rivet Machine).
Geo. F. Marchant Company.
Diesel Engines.
(See Engines, Oil.)
Diesel Engines—Lubricant.
Associated Oil Company.
Shell Oil Co.
Standard Oil Co.
The Texas Company.
Union Oil Co.
Discharge Louver Vent Heads
Westinghouse Electric & Mfg. Co.
Distillers.
Davis Engineering Corporation.
Ford & Geirrine, C. V. Lane.
Griscom-Russell Company.
Western Engineering Company.
Diving Apparatus.
A. J. Morse & Son.
Dredge Pumps
Westinghouse Electric & Mfg. Co.
Dredging Pumps.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corporation.
Drills, Pneumatic.
(See Pneumatic Tools.)
Dry Dock Control Systems.
Bethlehem S. B. Corp., Ltd.
Drydocks and Marine Railways
Bethlehem S. B. Corp., Ltd.
Moore Dry Dock Company.
Todd Drydock Corporation.
Edison Electric Appliance Co.
Edison Electric Appliance Co.
Westinghouse Elec. & Mfg. Co.
Electric Galley Equipment.
Edison Electric Appliance Co.
Westinghouse Elec. & Mfg. Co.
Ejectors.
Davis Engineering Corporation.
Westinghouse Elec. & Mfg. Co.
Western Engineering Company.
Electric Industrial Trucks.
The Yale & Towne Mfg. Co.
Electrical and Mechanical Installation Service.
Chas. Cory Corporation
Chas. J. Henschel Co.
Lalor Elec. & Engineering Co., Ltd.
Westinghouse Elec. & Mfg. Co.
Electric Clock System.
General Electric Company.
Electric Fittings.
Lalor Electric & Eng. Co., Ltd.
Chas. J. Henschel & Co., Inc.
Ets-Hokin & Galvan.
Electric Fittings and Supplies.
Chas. Cory Corporation
Chas. J. Henschel & Co., Inc.
Lalor Electric & Eng. Co., Ltd.
Ets-Hokin & Galvan.
General Electric Company.
Griscom-Russell Company.
Westinghouse Elec. & Mfg. Co.
Electric Log.
The Sperry Gyroscope Co.
Thomas Walker & Son, Ltd.
Electric Plants.
Chas. K. Dahl & Son Elec. Co.
Ets-Hokin & Galvan.
Fairbanks, Morse & Co.
General Electric Company.
Kohler Company.
Westinghouse Elec. & Mfg. Co.
Electric Welders.
Edison Electric Appliance Co.
Westinghouse Elec. & Mfg. Co.
Electric Wiring Devices.
Chas. Cory Corporation
Chas. J. Henschel & Co., Inc.
Lalor Electric & Eng. Co., Ltd.
Ets-Hokin & Galvan.
General Electric Company.
Westinghouse Elec. & Mfg. Co.
Engines, Distillate.
Western Machinery Company.
Standard Oil Co.
Engines, Gas.
Kearfott Engineering Co., Inc.
Standard Motor Construction Co.
Washington-Estep—W. H. Worden, Inc.
Western Machinery Company.
Worthington Pump & Machinery Corporation.

Trade Notes

Electric Locomotives for Terminal.—The Bush Terminal Company has ordered seven 55-ton oil electric locomotives from Ingersoll-Rand Company. They will be used in switching service at the company's terminal at the foot of Forty-third Street, Brooklyn.

Each of these locomotives is powered by an Ingersoll-Rand, 300-horsepower, railroad-type diesel engine. The General Electric Company will supply all the electrical equipment.

During the past five years nearly 100 of these locomotives have been placed in service in the United States by railroads, steel mills, lumber and mining companies, and other industrial concerns.

Vice-President Elected.—At a recent meeting of the Board of Directors of the Westinghouse Electric and Manufacturing Company, J. S. Tritle was elected vice-president and general manager in charge of manufacturing, sales, and engineering operations of the company, reporting to the president F. A. Merrick.

Mr. Tritle joined the Westinghouse Company in 1905 as manager of the Kansas City district. In 1915 the St. Louis and Kansas City offices were consolidated, Mr. Tritle assuming charge of both. In 1922 he was made manager of the merchandising division of the general sales department of the company. In 1925, Mr. Tritle was made general manager of the merchandising department overseeing engineering and manufacturing, as well as sales work, with headquarters in Mansfield, Ohio, where most of the merchandising products are made. From Mansfield he was moved to East Pittsburgh on May 1, 1929, as vice-president in charge of manufacturing operations. In his new position as vice-president and general manager, Mr. Tritle will retain his headquarters in the Westinghouse Company's main works at East Pittsburgh, Pa.

Research Laboratory Manager.—George B. Karelitz has been appointed acting manager of the mechanics division of the Westinghouse Research Laboratories, to fill the vacancy caused by the recent promotion of John M. Lessells to the South Philadelphia Works of the company.

Karelitz filled several positions with Westinghouse since he first joined the company in 1923, and was research engineer when he left last September to accept a place on the engineering faculty of Columbia University. Karelitz is regarded as an authority on bearings and balancing rotors for heavy equipment.

A Farewell Dinner—Thirty-three executives and department heads of the Associated Oil Company on June 10 attended a farewell banquet at the St. Francis Hotel, San Francisco, in honor of O. P. Cottrell, manufacturing manager for Associated, who leaves after twelve years of service with the company to take over management of the interests in the United States of the Edeleanu Company, Ltd.

It was with regret that farewell was said to Cottrell, who is recognized as an outstanding executive, chemist, and refiner. He was graduated from Columbia University with the degree of chemical engineer, and entered the petroleum industry in 1917 as research chemist for the Tide Water Oil Company, directing the manufacture of alcohol from compression gasoline, the manufacture of Veedol motor oils and greases, acid recovery distillation and other research problems.

Because of the high degree of perfection to which the Edeleanu process has been developed by the Associated Oil Company and the wonderful results produced under Cottrell's guidance, his fellow employees feel that the Edeleanu Company, Ltd., could not possibly have made a better selection.

Trade Literature

The Fuller Lehigh Circular Burner is the title of a new bulletin, No. 905, recently issued by the Fuller Lehigh Company, 85 Liberty Street, New York.

The Circular Burner, a pulverized coal burner of the turbulent type, is widely used for firing pulverized coal through solid refractory furnace walls with a minimum of alterations. The new bulletin describes the application, construction, and operation of the Fuller Lehigh Circular Burner, and copies of it may be obtained directly from the company.

A Modern Sea-going Power Plant.—Turbine electric drive today is called upon to send fast passenger liners around the world, mighty battleships on missions for their country, coast guard cutters on errands of rescue, ferries on their ceaseless shuttle that extends some pathway of progress. It is to a discussion of this modern ship propulsion and an exposition of successful installations that this new publication, S.P. 1814, **Turbine Electric Ship Propulsion**, recently released by the Westinghouse Electric and Manufacturing Company, is devoted.

Sturtevant Unit Ventilators is the subject of a 46-page, fully illustrated catalog (No. 377) recently prepared by the B. F. Sturtevant Company, Hyde Park, Boston, Mass. The many ways in which the new flexible Unit Ventilator may be used in helping to solve present-day ventilating problems are fully set forth and illustrated. The company has made extensive, scientific study of the problem of supplying fresh outdoor air, filtered clean, and tempered, to indoors and enclosed spaces; and the booklet gives a very clear, concise, and well illustrated answer to the question which the problem presents. Copies may be had free on application.

The Nautical Telegraph Code is the title of a handy sized little book published by Brown, Son & Ferguson, Ltd., The Nautical Press, 52 Darnley Street, Glasgow, Scotland. Price 3s 6d. net.

The book is compiled by Captain D. H. Bernard, late lieutenant-commander in the R.N.R., and is for use of officers in the merchant marine and all persons travelling aboard, including tourists, passengers, and foreign residents.

Pacific Marine Review

SEPTEMBER, 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

PACIFIC COAST SHIPBUILDING YARDS ARE A NATIONAL ASSET

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | SEPTEMBER, 1931 | NUMBER 9

Contents

Official Organ
Pacific American Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

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Official Organ
Shipowners' Association of the Pacific Coast

Alexander J. Dickie,
Editor.

Paul Faulkner,
Advertising Manager.

Chas. F. A. Mann, Northwestern Representative, 1413 Puget Sound Bank Bldg., Tacoma, Washington.

Children's Playroom

S.S. PRESIDENT HOOVER

Interiors Combine Moderne and Period Motifs

Detail of Bulkhead, Fireplace, and Door in Smoking Roo

Pacific Marine Review

VOLUME XXVIII SEPTEMBER, 1931 NUMBER 9

To Relieve Unemployment
Build New Fast Cargo Vessels

By Captain C. A. McAllister

President, American Bureau of Shipping

AN eminent publicist recently broadcasted his idea of relief for the unemployment situation in this country. This was given a great deal of space in the daily press on the following morning. Briefly his scheme was for the government to issue five billion dollars worth of bonds, the money to be used in erecting public buildings, digging canals, and making new highways. While the principle of this may be fairly sound, his scheme would hardly be found satisfactory, even if Congress should take the matter seriously. The federal government has already made large appropriations for public buildings and there are at present new roads building and contemplated for the current year amounting to one and one-half billion dollars, to be financed by the federal and state governments jointly. In the State of Louisiana, alone, authority has been granted to build 3200 miles of new roads. While no one can decry the great usefulness of the fine highway system which we now have and hope to better, there are other more urgent needs for the expenditure of public money which will be of the greatest assistance to the industries of this country. Notably among these is the urgent need for a number of cargo vessels and, after all, ships on the ocean are but an extension of roads on the land.

The vast fleet built for the Shipping Board during and after the war has now practically disappeared, as only 200 idle and practically obsolete vessels of over 2600 built during that program remain in the hands of the government. The best of the fleet has been used in establishing steamship lines to various ports in the world, the majority of which are now in private hands. While the Jones-White Bill has made a splendid start in providing modern and efficient ships of the combined passenger and freight types, nothing has been done thus far towards replacing our antiquated cargo ships with fast modern freighters, which after all must always form an integral part of a successful merchant marine. The problem has received the attention of shipping men and of the maritime branches of the government, but no real solution has yet been reached, although agreements have been arrived at as to the type desired, and preliminary plans have been drawn up to meet the general requirements.

In the interests of the farmer and the manufacturer, there must be provided in a very short time a considerable fleet of these modern freighters to meet the demands of our foreign trade. There are certain seasonal movements of commodities which must be provided for, notably grain, cotton, fruits, and sugar. If such a fleet is not soon built in the United States, we will once more be dependent on foreign carriers to help us out of the urgent conditions which arise periodically. In the highly competitive grain trade of the world, we cannot afford to rely on foreign ships to market our surplus wheat and other grains.

There is no branch of industry which has so many ramifications as the building of ships. It helps the miner, the steel mill employees, the farmers, and the manufacturers of almost an infinite number of the various items which enter into the construction of a ship. The benefits to be derived by our workmen, skilled and otherwise, would be widespread, covering practically every State in the Union.

The eastern shipyards are fairly well provided with work at the present time, but all the yards on the Pacific Coast which played so important a part in the construction of the war-time fleet are now idle and hundreds of the skilled workmen which they once employed are out of work. Owing to geographical conditions, it is impossible to build any large ships on the Great Lakes at the present time but the same conditions of unemployment obtain in the great shipyards in that region. While it would be impracticable to build ships, then cut them in two and transfer them to the seaboard, these yards could be given employment in building machinery and other essential parts of freight vessels.

On the return of prosperity, which we all agree must before long take place, there will be a pressing demand for a number of up-to-date cargo vessels. It would seem, therefore, a matter of good business at the present time for the government to authorize the construction of 100 modern cargo ships at a cost of $125,000,000. They could be built now for much less cost than when prosperous conditions return and would furnish occupations for thousands of the unemployed during this present state of depression. The government would not stand to lose any money eventually on an investment of this kind, as there would be a ready market for such freighters when prosperous conditions return, either by sale or bare-boat charter, to shipping firms.

Incidentally, they would furnish a much needed addition to the means for national defense. While Congress and a large portion of the public evidently look upon large expenditures for purely fighting ships at this time as an uneconomic procedure, no such criticism could be made of a fleet of merchant vessels such as suggested herein, as the ultimate cost to the taxpayer would be practically nil. The benefits to be derived on the other hand would be far-reaching, not alone in tending to give employment where now greatly needed but for the ultimate economic needs of the entire country. If we can spend vast amounts for emergent conditions during wartime, we should have no qualms about making appropriations of this kind for the emergent conditions of peace.

A Radio Marine Service of Mercy

A RADIO service as picturesque as the sea itself ministers to seafaring men ill or injured on vessels far from port with no surgeon on board. The master of a freighter, bending anxiously to-day over one of his men and wondering how he can save his life, may be a thousand miles from a hospital, but he is as close as his radio room to the best of medical advice. Radio's well organized free medical first aid service sees to that.

The possibility of using radio to fill a need which had been felt since men ventured to sea was seen first, as might be expected, by a veteran of the sea, Captain Robert Huntington, Principal of the Navigation, Marine Engineering and Radio School of the Seaman's Church Institute of New York. In the ten years since it was established by the Institute and later taken over by the Radio Corporation of America as a free service to all navigators it has brought a new and happy ending to much suffering on shipboard which previously had been unavoidable.

The big idea came to Captain Huntington in 1921 when messages from ships fog-bound calling for position were picked up frequently by radio sets used by the Seamen's Church Institute of New York in its Merchant Marine School.

His suggestion of free medical radio service was given publicity by the Institute, and Henry A. Laughlin of Philadelphia was so enthusiastic over the possibilities that he gave $5000 to install a powerful radio station on the roof of the Institute. Night and day shifts were kept on this station, KDKF, and calls for first-aid advice came rolling in. The Public Health Service cooperated by having physicians under its jurisdiction prescribe promptly for each case on the basis of the symptoms as described.

The first year of the service showed it was of such great value that I recommended to the board of managers of the Institute that the Radio Corporation of America be asked if it would take it over. An interview was had with Owen D. Young, now chairman of the executive committee of the Corporation. He showed his interest immediately and the next day David Sarnoff, now president of the Radio Corporation, and I had an enthusiastic conference.

Within a few days, much to our delight, the Radio Corporation had made all arrangements to take over the work, and has been running it ever since. To-day the service is given by the Corporation to ships of all flags. Medical aid messages, received without charge at any of the stations of the Corporation's marine subsidiary, the Radiomarine Corporation of America, are given precedence over all others, except distress calls. The advice of a United States Public Health Service physician is rushed back within a few minutes to the ship's master who has requested aid.

Even the fact that calls on the radio medical aid service have run into the thousands does not give the true picture until it is considered that nearly every call is urgent, and many a matter of life and death. For example this exchange between the steamship Hahira, somewhere at sea, and the Radiomarine Station at Palm Beach, Florida:

> Our pumpman badly gassed by crude oil fumes. Has palpitating heart. Seems to stop, then begin, at intervals.
>
> Master S.S. Hahira 2:10 P.M.

The reply:

> Master S.S. Hahira—Artificial respiration in fresh air necessary. Administer aromatic spirits of ammonia and apply cold cloths to head. If possible give hypodermic of amyl nitrate or nitro glycerine. Please advise progress.
>
> Pittmann, M.D. Delivered at 2:12 P.M.

At 3:48 P.M. this word came by radio to Dr. Pittmann in care of "Medico," the code designation of all free radio first aid messages:

> Many thanks for medical advice. Applied remedies. Man apparently fully recovered unless he gets a relapse. He is being watched.
>
> Master S.S. Hahira.

Radio companies serving other parts of the world—Norway, Sweden, the Philippines, Honduras, and tropical districts—have followed the lead of the Radio Corporation in volunteering their services free of charge.

[Abstracted from an article in the R.C.A. News by Rev. A. R. Mansfield, D.D., superintendent, Seamen's Church Institute of New York.]

Pacific Foreign Trade Convention

CUSTOMS barriers, fluctuating tariffs, unstabilized conditions in world trade, the silver question, the American merchant marine, pan-pacific communications, foreign credits, and Pacific Coast shipbuilding are a few of the interesting subjects included in the agenda of the Eighth Annual Convention of the Pacific Foreign Trade Council to be held on September 17 and 18, at Oakland, California.

Each year's progress on the Pacific Coast sees an increasing interest in world trade, larger attendance, and better programs at the Pacific Coast Foreign Trade Council conventions. Yearly the council is more nearly reaching its aim — "Pacific Coast Unity for World Trade Expansion." Yearly the convention is receiving wider recognition from leading business interests.

Representing directly the vast area included in the eleven Western States, Western Canada, Alaska, Hawaii, and Western Mexico, this convention is the most important trade meeting held west of the rockies and is growing rapidly in importance as the commerce of the Pacific Area develops.

A session of the convention will be devoted to shipbuilders and shipowners, who are invited to work on a plan "to permit the existing and now idle shipyards on the Pacific Coast to share equitably in the ship construction made possible through federal aid."

A Plea for Shipbuilding on the Pacific Coast

Showing How the Passage of the Carter Bill Will Make it More Possible for Western Shipyards to Obtain Shipbuilding Contracts

THE importance of the shipbuilding industry to any nation is universally recognized. It performs three important functions: first, as an industry; second, as a factor of National Security; and third, as a source of supply of vessels for the merchant marine.

Many of the maritime nations of the world have long recognized the importance of a large, up-to-date, merchant marine for the promotion of their foreign trade as well as for the national security, and these nations have provided various forms of governmental aid to assist shipowners in the building and operation of their merchant fleets.

In 1928 the Congress of the United States passed an amendment to the Merchant Marine Act, which amendment is known as the Jones-White Law. Under the provisions of this Act shipowners may now borrow from the government at a low rate of interest, a sum of money equal to three-fourths of the cost of a new vessel, provided said vessel meets with certain requirements of the Act. As a result of the passage of this Act, the shipbuilding industry has taken on new life in the United States, but up to the present time all of the activity is concentrated in a small area on the Atlantic Seaboard. In fact of the more than $140,000,000 thus far loaned by the government for the construction of vessels under the provisions of the Jones-White Act, **not a single contract has been awarded to a Pacific Coast shipyard.**

At the present time there are shipyards on the Pacific Coast prepared to undertake contracts for new ship construction that are unable to secure such contracts because of the distance from source of supply of raw materials.

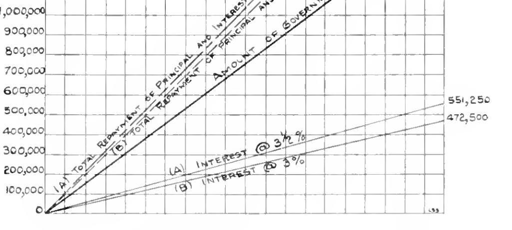
The Congress of the United States long ago recognized the importance of maintaining efficient steel shipbuilding plants on the Pacific Coast. It also recognized the fact that shipbuilding plants on the Pacific Coast could not successfully compete with the yards on the Atlantic Seaboard for reason of location so far from the source of supply of materials required in steel ship construction. In consideration of the public policy of maintaining steel shipbuilding facilities on the Pacific Coast so far from the basic materials supply, the United States Congress granted a 4 per cent. differential to Pacific Coast yards in bidding for naval vessels. The new construction work obtained by virtue of this differential enabled the Union Iron Works of San Francisco to maintain a fine organization, ready for any emergency repairs, for the building of several commercial vessels, and for a fair volume of general engineering work. This plant produced some of the most noted vessels of the United States Navy. It kept for fifteen years an average force of 3600 men profitably employed and distributed during that period over $47,000,000 in wages. In other words, it was the direct support of 15,000 population.

Because of continuous employment on new construction work, the shipyards of the Pacific Coast were able to build up splendid organizations of highly skilled personnel which proved their worth to the government in time of emergency by furnishing the nucleus of the supervisory forces of all of the West Coast shipyards that made such splendid records in supplying the ships so badly needed during the war.

It is more important today than at any previous time that the shipyards of the West Coast be maintained, for if some relief is not forthcoming at a very early date, shipbuilding will become a lost art on the Pacific Coast.

The United States Navy has recognized the importance of the Pacific Coast by maintaining its largest

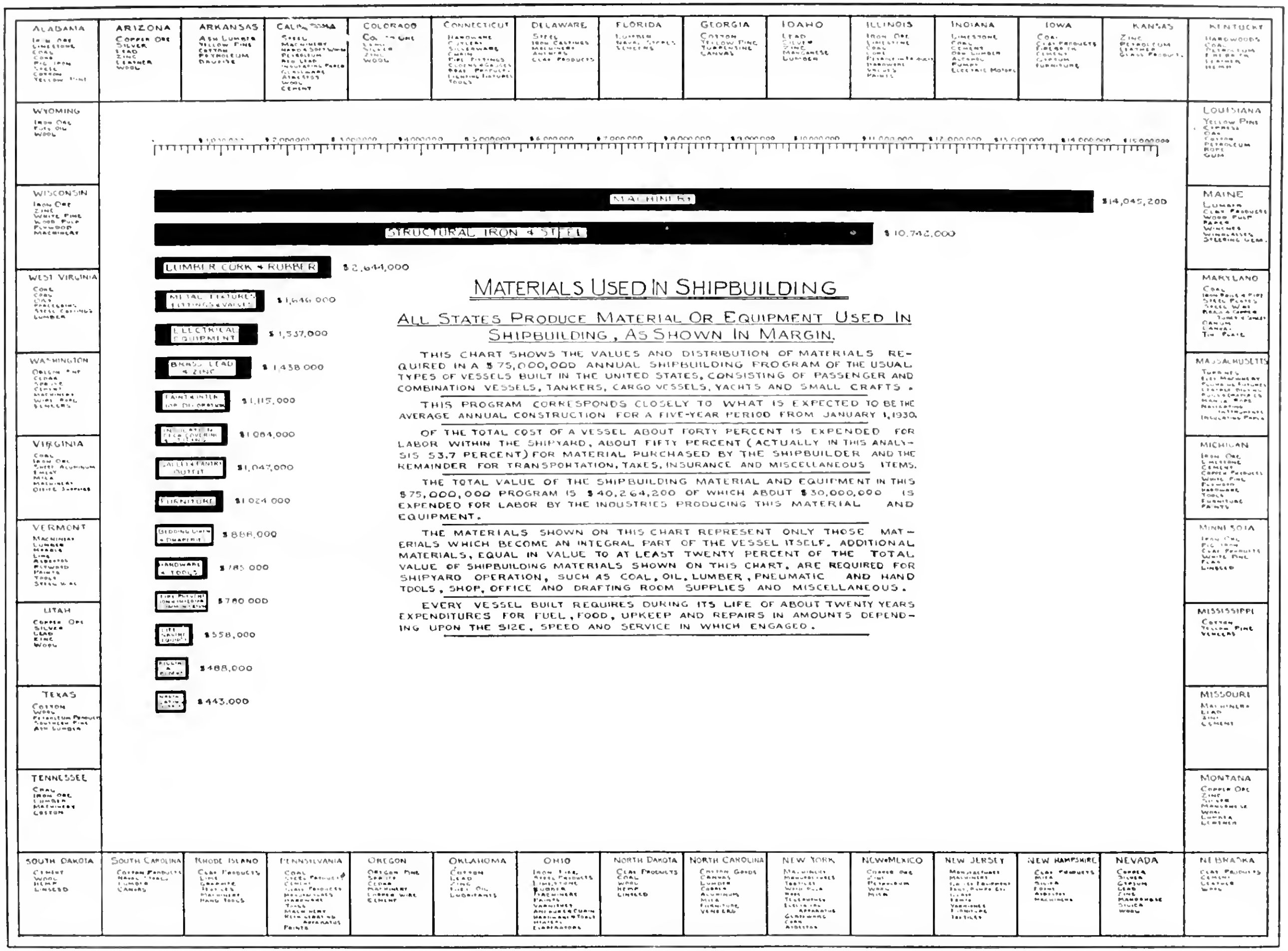
GRAPHIC CHART
SHOWING REPAYMENT OF PRINCIPAL AND INTEREST CHARGES ON LOAN FOR CONSTRUCTION OF A HYPOTHETICAL SHIP THE CONTRACT PRICE OF WHICH WOULD BE $2,000,000
(A) IF CONSTRUCTED UNDER PRESENT PROVISIONS OF THE ACT
(B) IF CONSTRUCTED IN A WEST COAST SHIPYARD UNDER PROVISIONS OF PROPOSED CARTER AMENDMENT



UNDER PRESENT PROVISIONS OF THE MERCHANT MARINE ACT THE SHIP OWNER WILL REPAY THE GOVERNMENT IN PRINCIPAL AND INTEREST CHARGES OVER A PERIOD OF 20 YEARS THE SUM OF $ 2,051,250.00

UNDER PROVISIONS OF PROPOSED CARTER AMENDMENT THE AMOUNT WOULD BE $ 1,972,500.00

THE DIFFERENCE IN THE ABOVE AMOUNTING TO $ 78,750.00 IS EQUAL TO APPROXIMATELY THE DIFFERENTIAL IN FREIGHT CHARGES ON MATERIALS FOR A VESSEL OF THIS SIZE BETWEEN POINT OF ORIGIN AND AN EAST AND WEST COAST SHIPYARD

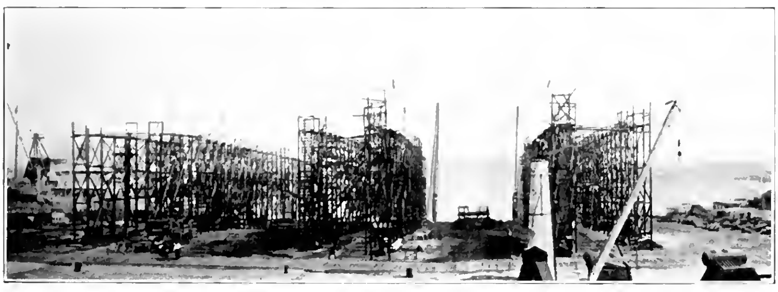


Every state of the Union contains industries which produce materials and equipment used in shipbuilding; and, therefore, not only the states containing shipyards but all the states are benefited by shipbuilding. Inasmuch as 80 per cent. of the cost of a vessel is expended for labor, of which one-half is expended in industries outside of the shipyard, and each state contains essential shipbuilding industries, it is evident that workmen in every section of the country are benefiting by the annual $75,000,000 shipbuilding program of this country.

Pacific Coast Shipyards Then and Now

Above: photograph of the Union Iron Works, San Francisco, twenty years ago showing many ships in process of construction, all the ways full. At left, recent photograph of the same yard showing all the ways empty.

At right, a view of the outfitting dock of the Los Angeles Shipbuilding & Drydock Corporation in 1919 showing three ships in the water. At this time there were four ships under construction on the ways.



Recent photograph of the Los Angeles Shipbuilding & Drydock Corporation's plant showing all slips empty.

fleet in Pacific Waters. Is it not then paramount that the shipyards of the Pacific Coast be maintained in the highest state of efficiency to care for the needs of this great fleet in the event of a national emergency? History has proved that in times of national emergency the navy yards have more than they can do to maintain the then existing fleet, and the government has depended entirely upon the commercial yards to supply ships not only of the merchant type to transport men and supplies, but also for the construction of naval vessels.

The provisions of the Carter Amendment to the Merchant Marine Act, which was introduced in the Seventy-First Congress, provides for a preferential of one-half of one per cent. in the rate of interest paid by the shipowner who builds his vessel in a Pacific Coast yard. Thus there is no difference in principal sum loaned by the government and the interest charges are reduced but one-half of one per cent. If the West Coast yards are able to obtain new shipbuilding contracts by virtue of the enactment of this Amendment, thus again establishing themselves as a vital aid to the national defense, the proposed amendment should certainly merit the support of every member of both houses irrespective of what section of the country he may represent.

The Pacific Coast is recognized as the logical center for expansion of our foreign trade, but from the standpoint of the national defense it is still more important that the commercial shipbuilding yards be maintained in an up-to-date and efficient manner.

Shipbuilding is an industry that benefits not only the immediate vicinity of the shipyard wherein new vessels are being constructed but because more than one-half of the cost of a vessel is for materials which are produced outside of the shipyard and these materials are produced in practically every state of the Union the entire country receives benefits proportionate to the materials produced in the various states. The National Council of American Shipbuilders recently compiled an analysis of the classes and quantities of the several kinds of materials used in a composite shipbuilding program, including the construction of passenger vessels, combination passenger and cargo vessels, cargo vessels, oil tankers, and miscellaneous small craft which constitute the normal character of the business of the shipbuilding indutsry, which is graphically illustrated in the accompanying chart "A".

A program of $75,000,000 a year represents approximately the volume of ship construction necessary in the United States to replace the vessels now in operation and to continue the same tonnage now actively employed. The result of the analysis is enlightening and shows that of the proposed $75,000,000 annual program about $30,000,000 is spent for labor at the shipyards, more than $40,000,000 is spent among allied industries for the purchase of materials and equipment used in building vessels, of which more than $30,000,000 is expended for labor by the industries producing the materials and equipment. It was found that each state of the Union participates in the supplying of not only one but of several commodities. The classification of these commodities was divided into sixteen main groups in the order of their value, of which machinery is the greatest and structural iron and steel is next.

The analysis further discloses that there are coastal, Great Lakes, and river shipyards in the States which include 57 per cent. of the area of the United States and 85 per cent. of its population.

Although the benefits of a revival of shipbuilding in the United States are nation-wide and the materials which go into the construction of a modern vessel are produced in almost every state of the Union, it is only natural that the benefits to the nation as a whole would be far greater if new ship construction were distributed to both coasts of the United States instead of being concentrated as at the present in a small area of the North Atlantic.

Prior to the war the shipyards of the Pacific Coast had built some of the finest and largest American naval and merchant vessels and thus by experience were enabled to cope with the national emergency which arose. Under present conditions the entire nation should awaken to the alarming condition which now exists in the shipbuilding industry on the Pacific Coast and see to it that ways and means are provided for the shipyards of the Pacific Coast to be enabled to successfully compete with the shipyards of the Atlantic Coast in obtaining new shipbuilding contracts. If the need of steel shipyards on the Pacific Coast existed prior to the war, the need that these yards be maintained and kept up to date is even greater today. If Congress in its wise judgment enabled these yards to build ships and train highly skillful personnel by virtue of a differential in cost of construction of naval vessels at that time, ways and means should be provided at this time to enable these yards to carry on, and the Carter Bill will go a long ways toward accomplishing this purpose.

The Carter Bill does not provide any direct aid to the shipbuilders, but by virtue of the one-half of one per cent. reduction in interest rate it will enable the shipowners who may desire to build their ships on the West Coast to do so, as it will permit the West Coast shipbuilder to include a portion of the cost of transporting materials from the sources of supply in the East and Middle West to the Pacific Coast. Recent estimates submitted have proved that the cost of building ships on the West Coast are no greater than on the East Coast excepting for the item of transportation of materials. Labor conditions on the West Coast are good and at the present time the available supply is plentiful. Weather conditions are ideal; and the only thing that stands in the way of the West Coast successfully competing in the present contemplated shipbuilding program is the cost of transporting materials.

As a serious matter of national defense and in order that these yards may again be in a position to render the efficient service that they did to the Nation in the last great emergency, THE SHIPYARDS OF THE PACIFIC COAST SHOULD BE MAINTAINED.

Merchant Marine Progress

After ten years of effort, devoted largely to pioneering work in the establishment of American lines in the essential trade routes, we have succeeded in building up the American Merchant Marine in the foreign trade of the United States until now 700 vessels of nearly 4,000,000 gross tons are available, rendering regular and dependable service to all the principal ports throughout the world.

—Commissioner S. S. Sandberg, of the U. S. Shipping Board.

A New Type Business and Research Cruiser

By G. Bruce Newby
Naval Architect

G. Bruce Newby

VELERO III, recently completed at the yard of Craig Shipbuilding Company of Long Beach, California, is a craft that deserves the attention of shipbuilders and shipowners. This vessel, considered by the public as a yacht and a pleasure boat, is not being built for this purpose. Owned and mastered by Captain G. Allan Hancock, a sportsman and business man of Los Angeles, the cruiser will be used entirely for business and scientific research. Captain Hancock is a scientist and explorer. No ordinary yacht would fulfill his needs.

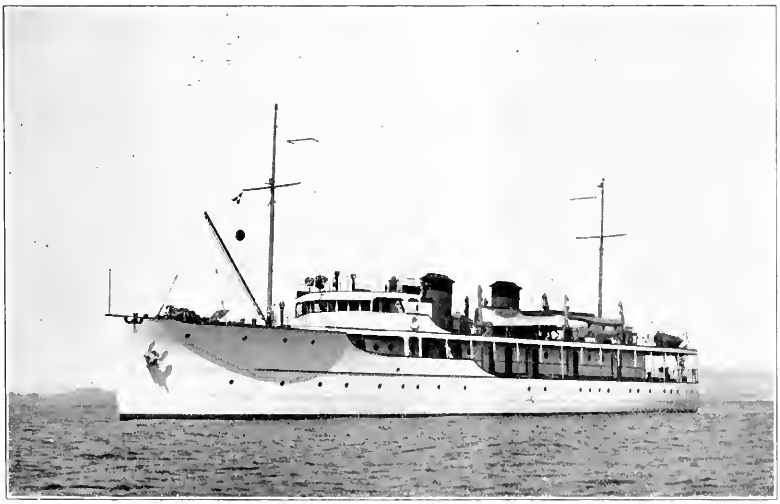
Velero III is a typical cruiser, with the profile appearance of a Coast Guard cutter or a destroyer. The owner particularly instructed his naval architect, G. Bruce Newby of Los Angeles Harbor, that the appearance and features must follow the new Coast Guard cutters, recently built on the Pacific Coast, as closely as possible. The result has proved remarkable.

The pilot house with its eleven Kearfott windows gives a range of vision unsurpassed by boats many times her size. Her maneuvering equipment is equal to the finest passenger boats or naval cruisers. This equipment consists of Sperry gyro-compass with three repeaters, a Sperry automatic helmsman, a radio range finder, a Fathometer, and a Lord Kelvin standard compass. The controls and telegraphs are worked from both pilot house and flying bridge above. In the pilot house is arranged a clear vision screen. Communication with the engine room is primarily by Henschel telegraphs, with the addition of voice tubes and phone.

The public spaces, consisting of the dining saloon, lounge, and connecting corridor, have the steel deck and beams above exposed and painted. Vehisote paneled ceiling is fitted from deck up the sides to the toe of brackets. The effect is austere but pleasing. Interior decorations (by Miss Marion Mullins, with materials furnished by Lesher, Whitman and Schumacher Co.) are in perfect accord with the simplicity of this finish. Two-inch cork insulation, installed by Mundet, is fitted between deck house plating and the Vehisote finish. The steel deck in public spaces and guest and owner's quarters is covered with Armstrong special compressed cork, over which Linotile is laid.

In the crew's quarters, the berths are double-decked. These berths, together with special mattresses and Deepsleep pads, were furnished and installed by the Simmons Company; and it is claimed they are the last word in sleeping comfort for crew accommodations.

Smartly designed Simmons metal beds, finished in color and in form to harmonize with the interior decorations of the individual staterooms, were supplied for the cabins of the owner and his guests. These beds are furnished with the famous Simmons Ace-Coil



Velero III and her owner, G. Allan Hancock on the bridge.

springs and Beautyrest mattresses. Similar equipment is supplied for the beds and couches of the open air lounging and sleeping spaces.

A grand stairway leads to the owner's and guest quarters below and aft. These quarters are insulated at shipside with 2 inches of cork. All staterooms are inclosed by steel divisional bulkheads, insulated with 1 inch of cork. By experiment, a finish has been found for this cork that requires no further ceiling to make it pleasing and enduring. The vessel is rat and vermin proof.

Three-way staircase on the Velero III. Note neat appearance of exposed wiring and deck beams.

In finishing the cruiser Velero III, the new DuPont Du-Lux marine finishes were extensively used. On her exterior they were applied to the houses, hull, and masts. On her interior, Du-Lux was used in the cabins and in the engine room.

These new finishes were selected after careful investigation. It was found that, in addition to extensive laboratory and marine exposure tests covering a four-year period, for two years Du-Lux had been used on ships in service for all areas above the water line with complete satisfaction. In comparison with ordinary paints, Du-Lux is said to have greater durability, greater retention of original gloss and color, and greater resistance to checking and cracking. These distinctive characteristics are due to the use of the Du-Lux vehicle, instead of linseed oil or varnishes, as the carrier for the pigment. This vehicle, a distinct chemical compound, is an exclusive development of DuPont Company and has none of the properties commonly associated with rosins, gums, and oils ordinarily used in paints.

The Du-Lux produced a smooth, lustrous surface,

Owner's and guest's staterooms on the Velero III.

which will be unaffected by gasoline and oil and which will be readily kept clean.

Navigation and Safety Equipment

The boat equipment consists of two 24-foot Tregoning built, motor powered, steel whaleboats, and two 24-foot Fellows & Stewart-built motor powered, wooden fishing and shore boats. These boats are handled by Welin mechanical davits and McMillan blocks. In addition two 16-foot skiffs are handled by ordinary davits. A life raft is stowed aft on the boat deck. The boats are hoisted by an Allan Cunningham boat hoist, driven by a 15-horsepower, water-proof, Westinghouse motor.

The Radio Corporation of American has installed, in the radio room on boat deck, long and short wave radio sets which enable Velero III to keep in communication with the world from the most remote locations. This radio equipment is supplemented by a standard receiving and local broadcasting set. The speakers, which are auditorium type dynamic units, have been fitted in the after music room bulkhead, in the bulkhead in the shelter, and in the dining saloon.

The general alarm system having five stations is controlled from the bridge. A navy standard blinker light has been installed on top of foremast with key box arranged for portable operation from the bridge. Baldt anchors and Baldt forged Di-lok chain are handled by an Allan Cunningham windlass driven by a Westinghouse, 20-horsepower, water-proof motor.

A steering arrangement has been fitted which can quickly be changed over from the Sperry 6-horsepower steerer in the engine room to a screw-type hand steering gear in the lazarette, with phone communication and a standard compass nearby.

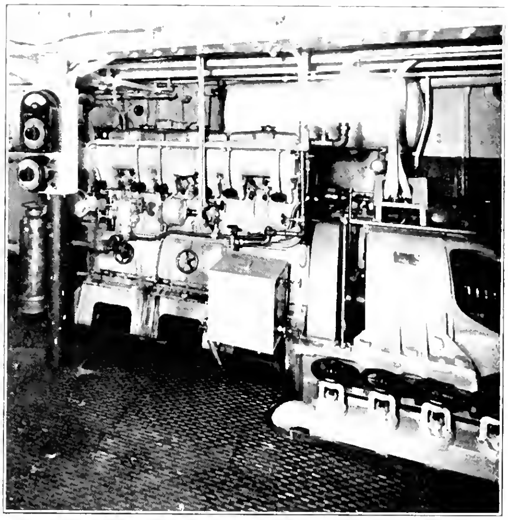
The propellers turn opposite a large aperture, aft of which an Oertz streamline rudder is fitted. Her stern assembly under water closely resembles the Bremen in miniature. A small bulbous bow has enabled the designer to work a fullness in her bow lines that is very pleasing to the eye, giving good resistance to plunging and aiding speed.

A very unusual feature of the Velero III is the arrangement for cold and dry stores. These storage rooms are confined to the forward section between the deep tank and forward trim tank and between the double bottom and lower deck. This space is served by

Some Interiors of the Latest Pacific Coast Seagoing Business Cruiser

Outdoor lounge and sleeping porch of the Velero III.

The galley is equipped with modern electric cooking apparatus specially designed for rough service at sea. Above is the Edison General Electric Appliance Co. range.



At left, the main working platform of the engine room of Velero III with the two Winton 850-shaft horsepower main propulsion diesel engines.

Above, one of the two 115-shaft horsepower Winton diesel engines driving a 75-kilowatt Westinghouse generator.

a water-tight trunk leading from a hatch in forecastle deck four decks down to the cold stores space. To appreciate this arrangement it is necessary to see it. Those who have visited the vessel do not hesitate to praise this feature as being unusual. Refrigeration is furnished by York. The machinery, dual units, is located in a space apart from the engine room.

Machinery

The engine room of the Velero III is worthy of a naval cruiser. This room is 46 feet long with a balcony at the lower deck level. Gratings are fitted at this level and at the upper deck. The skylight, of a size giving ample space to remove any piece of machinery as a unit excepting the main engines, has been arranged directly over the center of the machinery space.

The propelling machinery consists of twin Winton 850-shaft horsepower, air-injection, diesel engines, each directly connected to a propeller shaft. Her lighting, heating, and all auxiliary power is electrical. Two 115-shaft horsepower, solid-injection, Winton engines, each driving a 75-kilowatt Westinghouse generator, are located at the forward end of the machinery space. In addition to these are two 20-kilowatt generators driven from the main shaft line. This total of 190 kilowatts drives all pump and refrigerating motors, heats all public spaces and staterooms, heats water for all usages, operates the windlass, capstans, and other deck machinery, ventilates the hull, and supplies illumination.

The 20-kilowatt generators, run by vee-belt drive from the main shaft lines, are arranged to run parallel. If the shaft revolutions per minute are slowed to 10 per cent. under, or increased to 10 per cent. above, cruising revolutions, the generator will cut out and a bell on the switchboard will give warning. To cut in again a switch must be thrown. The very latest type of Westinghouse switchboard has been installed. This board is dead-front, 11 feet long and 7 feet high. Seventeen thousand feet of leaded and armored cable has been run all exposed, no conduit being used. All lighting fixtures are especially made for this ship by Schweitzer to fit special requirements.

Exide Iron-clad batteries, of 900-ampere-hour capacity, in a special room, are floated on the line and act as an electrical sponge to absorb surplus juice, give off the necessary current before generators are started and, take over the electrical load in emergencies.

The piping deserves special mention. Toncan piping and Victaulic couplings, furnished by Ducommun, are used wherever possible. The fuel tanks (sixteen in number) can be filled through a single filling line from both port and starboard sides. The filling lines lead to duplicate manifolds. These manifolds have valves arranged so that oil can be transferred by duplicate Northern rotary pumps from any one tank to any other tank, to the day tank or overboard. The capacity for fuel oil is 54,000 gallons, which gives the Velero III a cruising radius of 9500 miles at 14 knots.

The bilge, ballast, and fire systems are handled separately by Winton plunger-type pumps, cross-connected. The fire pump delivers 100 gallons per minute at 100 pounds pressure.

There are two systems for fresh water, one for drinking and cooking only being stored in tanks located between shaft alleys and raised above the double bottoms so there can be no contamination. The second system is for lavatory, shower, and laundry purposes, with water stored in tanks next the shell. There is no connection between the systems except by a portable section of pipe kept under lock and key by the master. The capacity in fresh water is 18,000 gallons, equally divided between the two systems. Fresh water is circulated by Westco automatic pumps and pressure tank. The water for lavatories and showers is heated electrically by Wesix heaters. The vessel is divided into three zones for heating water, one heater supplying each zone. This will prove economical as the crew's system may be used independently of the owner's and guest system when the latter are not aboard.

The salt water sanitary system is also circulated by Westco automatic pump and pressure tank. Soil and drain lines lead to a sump tank. This tank is automatically pumped out at a certain level by duplicate Byron Jackson centrifugal pumps.

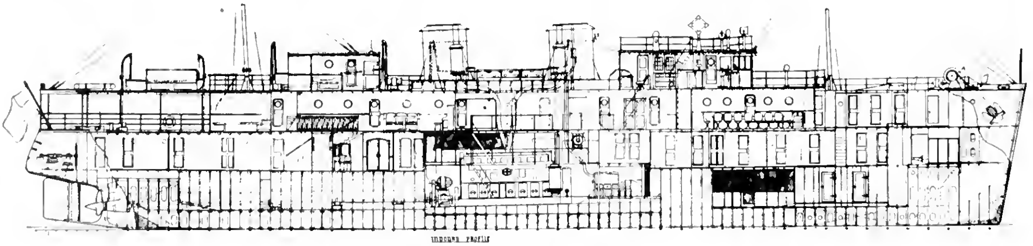
A 250-gallon Worthington centrifugal pump has been installed for auxiliary circulating system in the case of a breakdown of the engine pumps. A general service pump has been installed to serve all fresh and salt water lines.

Two De Laval purifiers are used, one on lubricating oil and the other on fuel oil for the solid injection generating engines. Fuel oil for the main propelling air injection engines will ordinarily not be purified. However, the purifiers have been piped so that all fuel oil can be purified if found necessary.

Ventilation System

A modern system of forced ventilation, using Ilg blowers, has been installed, supplying fresh air to all guest rooms and crew quarters. All toilets have the air exhausted. Separate systems are used for each water-tight compartment to avoid puncturing water-tight bulkheads. The galley and pantry, located above the upper deck, have the air exhausted, making a change every three minutes. The machinery space and shaft alleys have air forced in and assisted by natural ventilation. The battery room has a natural supply vent with air exhausted by blower through a leaded duct up the forward stack.

(Please turn to Page 396)



Inboard profile of the Velero III.

The Problem of the Screw Propeller

A Nonmathematical Treatment for the Operating Personnel

By Dr. W. F. Durand*

WHILE the screw propeller is in appearance a simple enough body, there are, in point of fact, few problems in engineering which involve a greater number of factors than those connected with this simple-appearing body. These factors act and interact among themselves in a most intricate fashion and thus render the problem of the screw propeller one of the most complex with which the engineer has to deal. Without pushing matters to the extreme, we may readily identify fifteen different and independent factors upon which the problem of the screw propeller depends. It will perhaps be a matter of interest to list these factors and pass rapidly in review the general character of the influence which they may have on the performance of the propeller.

Factors of Problem

These fifteen factors fall naturally into three classes according as they relate to the propeller as a geometrical and physical body, to the medium in which it works, or to the conditions of operation. We may then list these factors as follows:

A) Characteristics of the propeller as a geometrical and physical body.

1) The diameter or general determining dimension.
2) The pitch of the helicoidal surface employed for the driving face. This may have two different modes of specification; viz.,
   a) The single value of the pitch if uniform.
   b) The distribution of values if variable.
3) The form of the contour bounding the blade or helicoidal surface employed.
4) The area of the blade on the driving face.
5) The cross-section or thickness of the blade. This may have two modes of specification; viz.,
   a) Areas of cross sections and their distribution radially.
   b) Forms of cross sections.
6) The form and dimensions of the hub or central body carrying the blades.
7) The character and finish of the blade surface.
8) The density of the blade material.
9) The coefficient of elasticity and the ultimate strength of the blade material.

B) The characteristics of the medium.

10) Density.
11) Viscosity.
12) Compressibility (velocity of sound).
13) Character and extent of turbulence or departure from homogeneous conditions.

C) The characteristics of operation.

14) Speed of translation or speed of advance.
15) Speed of rotation.

Referring now, briefly, to these various factors, we note that the diameter is the controlling dimension and is thus primarily influential in determining the amount of power which can be absorbed. With other conditions unchanged, the amount of power will be proportional to the disk area and hence to the square of the diameter. As such, the diameter has no measurable influence on the efficiency of the propeller. It may be that efficiency is in some small degree dependent on absolute dimension, but if so it is too small to be readily measurable and for practical purposes we may assume that efficiency is independent of the size as such.

Pitch Ratio

Passing now to the pitch of the propeller, we come to one of the most influential elements in the performance of the propeller, both economically and generally. The influence of the pitch is usually expressed through its relation to the diameter—the pitch ratio so called. Other conditions remaining the same, the higher the pitch ratio the lower the revolutions and vice versa. As regards the economic performance, the pitch ratio is the most influential single factor. Beginning with very low values, less than unity for example, the best efficiency will continually increase with increase of pitch ratio up to some value far beyond usual practice; so that it is fair to say that, if other conditions will permit, the higher the pitch ratio the higher the efficiency which may be reached. It should be noted that the word here is **may** and not **will**. The propeller of higher pitch ratio will have possibilities of higher efficiency, but in order to realize this higher value, the conditions of operation, especially as regards diameter, speed, and revolutions, must be such as to give the proper combination for this higher efficiency. It is there, but the designer must go where it is in order to realize its full measure.

The reason for this especial influence of pitch ratio on efficiency may be explained in various ways, but for present purposes it will perhaps best serve if it is put as follows:

The blade of a screw propeller may be considered as made up of a series of radial elements each of which may be considered as acting on the water something as an airfoil acts on the air. Then the summation of the actions of all these elements represents the action of the blade as a whole. Now it may be shown, on strict mechanical principles, that under usual conditions of operation those elements of the blade which make an angle of a little more than 45 degrees with the fore and aft direction operate with the highest individual efficiency. The ideal would then be, of course, to have the whole blade at these angles. But that is impossible with a helicoidal surface and with the shape that the blade naturally takes. It results, however, that with a propeller of very low pitch ratio, practically none of the effective working face is at the best angle. It is all twisted around at an angle beyond this best point. If, however, the pitch ratio is increased, the angles with the fore and aft are decreased and some part of the

*Substance of a talk to the Propeller Club of California at San Francisco. Dr. W. F. Durand is former Dean of Colleges of Engineering at Stanford University and Past-President of The American Society of Mechanical Engineers.

blade, perhaps near the root, operates at about this best angle. With further increase the part of the blade at about 45 degrees moves out still further from the hub and, absorbing more and more power, becomes more and more influential in raising the general resultant efficiency. If this is carried too far, the entire blade will stand at angles less than 45 degrees and the efficiency will again fall off.

However, it may generally be assumed that with usual operating conditions the higher the pitch ratio which can be conveniently employed, the higher the efficiency which may be attained.

There is another aspect of pitch regarding which a word should be said. The face of the blade may be a true helical surface; that is, a face with uniform pitch; otherwise the pitch may vary over the face in some arbitrary manner—across the blade from leading to following edge or from root to tip or both. All sorts of combinations have been tried out, and it may perhaps be assumed that for any one set of operating conditions and with any one ship some mode of pitch variation would show some advantage as compared with a blade of uniform pitch. The gain at best, however, is but small and it can hardly be said that the matter has, as yet, been put on a sufficiently definite basis to enable the designer to make sure of any sensible advantage from variation of pitch over the face. The realization of high efficiency is dependent in far greater degree upon other factors than upon some selected mode of variation of the pitch over the face of the blade.

Form of Blade

Regarding the form of contour of the blade, we now know that so long as the form is generally oval or elliptical minor variations in contour form have only a negligible effect on the economic performance. The early forms with very wide tips and nearly sharp corners were distinctly poor in economic performance, but with the general adoption of contour forms roughly elliptical or oval, no further significant improvement in this direction seems probable.

The area of the blade on the driving face is perhaps the second most influential factor in the performance of the propeller. The greater the area (within limits) the greater the power which can be absorbed, but at a continuous loss in efficiency. The ideal here would be very narrow blades with resultant small area per blade and corresponding good efficiency. But here operative conditions enter. If a given power is to be absorbed, increase of area will save in diameter, and diameters are often limited. In some cases, therefore, increase of area, even at the sacrifice of some efficiency, must be accepted in order to meet unavoidable conditions of operation.

Number of Blades

The number of blades has not been listed as a separate factor in the performance of the propeller, primarily because the number is chiefly instrumental as it affects the blade area. That is, the amount of power which can be absorbed and the efficiency which can be realized are more directly dependent on the total blade area than upon the number of blades among which it is divided. Other conditions, as, for example, the influence of the propeller in producing vibrations in the ship or, again, the cost of manufacture may determine the choice of three as against four blades, but with these aspects of the case we are not for the moment concerned.

As generally proportioned, a four-blade propeller, other things equal, will not show quite as good efficiency as a three-blade propeller; but this may be assumed to be due rather to the greater area which it carries than to the fact that it has four blades.

Regarding the increase of the power with increase of area, this can only be carried to a certain degree, beyond which the gain in power absorbed is negligible. The point is this: the blades of the propeller act on the water to give it an acceleration aft. Under a given set of operating conditions, the amount of this added velocity is fixed and the thrust which can then be developed and the power which can be absorbed vary simply with the amount of water which can be acted on in this manner. But the flow of water through the disk area of the propeller is the total measure of the water available for this action and when enough blade area has been supplied to act effectively on substantially the whole column there is no more to be gained by adding further area. Such addition can add neither in making the acceleration of a given water particle greater nor in adding to the number of particles. The limit has been reached.

Actually, however, as such a limit is approached the gain in thrust due to added action becomes less and less, while the loss due to added friction on the blade surface continuously increases and the efficiency continually decreases. It thus results practically that we must be content with action on something less than the full column in order to realize an acceptable measure of efficiency. Here, as elsewhere, the result is a compromise between mutually conflicting and irreconcilable factors.

Blade Section

Coming now to the question of the form of the cross-section of the blade, it should be noted that until recent years the usual form was that of a segment of a circle, or at least a section practically symmetrical about its mid-width and hence with the maximum thickness at the center of the section. Due to the studies on airfoils, however, and to the more efficient showing of sections with the maximum thickness carried forward approximately to one-third the width from the leading edge, such forms are now recognized as having some advantage over the symmetrical section.*

The difference is not great, perhaps two or three points in efficiency, but the possibility of this gain is well worth the attention of those interested. It may be remarked in passing that for air propellers, such form of cross-section has long since been standard; and from the underlying principles of fluid mechanics we should reasonably expect the best form for air to be also the best for water.

The areas of the cross-sections are determined primarily from considerations of strength. The ideal would be relatively thin sections throughout, but the propeller blade acts as a cantilever beam under a distributed face load and is subjected, at the same time, to the centrifugal force arising from its rotation. These conditions force the provision of sections thicker and thicker the nearer the hub. It cannot be expected that the thick sections near the hub act with high efficiency, but for structural reasons they must be accepted along with whatever loss in efficiency may result.

The influence of the hub depends chiefly on its size and on the presence or absence of a fair water body at

*See D. W. Taylor, Transactions S.N.A. & M.E., 1930, p. 277.

the after end. In the case of propellers with fixed blades the hub may be small; with detachable blades it must be relatively large. In any case there should be some form of after body fairing in the form and reducing the resistance which would result from dragging the flat after face through the water.

The character and finish of the blade surface will be influential in two directions. A smooth, polished surface with sharp following edges will reduce skin friction and will be distinctly less favorable to pitting as a result of cavitation than a rough and irregular surface. Such a surface will exaggerate frictional loss and any little irregularity such as a pit or lump may serve as a convenient point for the start of pitting in case the propeller is operating under conditions where cavitation may occur. In recent years the importance of these matters has come to be better understood, and to-day in the highest grade of practice the matter of surface form and finish receives careful attention.

The density of the blade material enters as a factor in the centrifugal force to which the blades are subject in operation. As noted above, a propeller blade acts as a cantilever beam supported at the hub with a hydraulic load distributed over its face and subject to further load from the centrifugal force developed in rotation. The condition of stress over the cross-section is complex and the part played by the centrifugal force is an important element, especially with high rotative speeds.

The coefficient of elasticity and the ultimate strength of blade material may be considered together. The former is influential as a factor in the yield or distortion of the blade under load and the second as determining the size of the sections which must be supplied in order to give to the blade the required strength with a suitable factor of safety.

Characteristics of Water

Passing now to the characteristics of the medium in which the propeller works, we have first the density. This is a direct factor in the forces which act on the blade or otherwise of the power which can be absorbed. It is this factor which produces the greatest element of difference between the air and the water propeller. The density of water is more than 800 times that of air with consequent far-reaching differences in the conditions of operation of propellers in the two media. The water propeller here scores one advantage in that the density of the medium in which it operates is always the same, except as we may pass from fresh to salt water or vice versa, while the density of the air varies in marked degree with altitude and with it the conditions under which the air propeller must operate.

For the water propeller, therefore, density thus only enters as between conditions of operation in salt and fresh water, but since resistance varies also with the same factor, the force relations between the ship and the propeller remain substantially the same whether in fresh water or salt.

Viscosity is the determining factor in the formation of eddies and turbulence. These represent energy in a state which can never be recovered in terms of pressure or force acting on a ship or on a propeller blade. The formation of eddies and turbulence represents, therefore, a constant drain on the fuel pile, and the ideal is to reduce the aggregate of such formation to the lowest minimum possible.

Compressibility of the medium becomes only significant as a factor where the tip velocities of the blade may approach the velocity of sound in the medium. This item may be of some importance in high speed air propellers, but the velocity of sound in water (about 4700 feet per second) is so far beyond any tip speed of a propeller in water that we may consider this factor as of no significance for the marine propeller.

The character and extent of the turbulence in which the propeller works may be linked with viscosity, the determining factor in causing turbulence. The action of the blade on any particular particle of water will depend on the direction of the motion with which it meets the blade and this will depend on the details of the turbulent water in which the propeller works. We have no quantitative measure for such a factor and must depend simply on experience with actual ships and with actual propellers as a guide.

Conditions of Operation

Coming now to the last two factors on our list, representing the conditions of operation, we have first the speed of advance and second the speed of rotation. These are usually joined with the diameter in the form of a single expression V/nD where V is the velocity in feet per second, n is the revolutions per second, and D is the diameter in feet. In this form this fraction gives a general measure of the operative conditions with special reference to the geometry of flow to and through the propeller. It is related to the angle of attack of the blades on the water and if two propellers of different dimensions, of the same pitch ratio and otherwise similar in geometrical form, are operating at the same value of V/nD, then we may assume that the angles of attack for similar blade elements are the same and, broadly, that the conditions which affect efficiency are the same throughout and that both propellers should show the same efficiency.

Before closing it may be of interest to note the way in which power is related to the three principle characteristics—Diameter, Speed, and Revolutions.

If we have any two or, more generally, any number of propellers all of the same pitch ratio and similar geometrically throughout, then, for the same value of V/nD, the efficiencies will be the same, except for secondary factors the influence of which is usually not important; and furthermore the power will be proportional to the square of the diameter multiplied by the cube of the speed, or again to the cube of the revolutions multiplied by the fifth power of the diameter, or still again to the fifth power of the speed divided by the square of the revolutions.

Interaction with Hull

We have thus far been concerned with the propeller alone and without direct reference to the ship on which it is to operate. Actually in matters of design the two must always be considered together. The propeller reacts on the ship and the ship on the propeller, and this interaction must of necessity enter into the problem of design in order that the propeller characteristics finally selected shall be not only well adapted to the general conditions of operation of the propeller as such, but also that they shall be adapted as well as possible to the particular form of the ship upon which it is to work. This phase of the matter is, however, beyond the scope of the present article, the purpose of which has been to discuss very briefly the manner in which these many factors enter into and contribute, each one its share, to the complex problem of the screw propeller.

Some New Ships for Pacific Service

Europe Building Many Fast Motorships and Steamers for Pacific Ocean Routes

By R. C. W. Courtney

ALTHOUGH European shipping taken as a whole still appears to be in the throes of depression, and very few orders for new construction are being placed, there is, however, one outstanding fact; namely, that those lines operating direct services to Pacific Coast ports are prospering and that the future is undoubtedly full of possibilities. Various instances can be given, such as the recent order for three high-class motorships for Westfal Larsen account, the decision of the East Asiatic Co. to order a third vessel of the Amerika class, and the fact that the Royal Mail Steam Packet Company's motor liner Lockmonar recently unloaded a record Pacific Coast refrigerated cargo at Southampton.

Of the new ships recently commissioned for European ownership, the greater percentage of which, incidentally, are diesel driven, the most important is the Pacific Steam Navigation Co.'s quadruple-screw Reina del Pacifico, built at Belfast by Harland and Wolff, which has already completed a highly successful maiden voyage and bids fair to revolutionize communication between the Old World and West Coast ports of South America via Panama. The most interesting feature of this vessel, which has dimensions of 550 feet between perpendiculars by 76 feet by 44 feet, molded, is, of course, the propelling machinery. This consists of four trunk piston, 4-cycle, airless-injection engines of the Harland-Wolf-Burmeister & Wain design which are notable as comprising the largest of their type so far fitted in a merchant ship. Each has 12 cylinders, 24.8 inches in diameter by 47.24 inches stroke, and under the most conservative service conditions is capable of producing 4500 brake horsepower at 135 revolutions per minute. The combined power of 18,000 brake horsepower enables over 20 knots sea speed to be maintained with an ample reserve. Continuous supercharging on the Buchi system is effected by four independent exhaust turbines each direct connected to a 2-stage blower. Passenger accommodation is on luxurious lines and, following the fashion apparently first set many years ago by the C.P.R. Empresses, the ship is painted entirely white.

It is also perhaps as well to record that the new Norwegian express motorship Venus recently completed for service between Bergen and Great Britain, which is claimed to be the fastest diesel engined vessel at present in service, is also equipped with trunk-piston plant of similar type supplied by Burmeister and Wain and comprising twin 10-cylinder units collectively developing 10,000 brake horsepower at 150 revolutions per minute, with continuous pressure induction.

The delivery of the Compagnie Generale Transatlantique cargo liner San Pedro marks the completion of another important batch of ships specially designed and built by Harland & Wolff for North Pacific ports service and particulars of which have already appeared in these pages. The latest vessel of the class, however, differs from the other five ships in respect to the propelling machinery, as a Bauer-Wach exhaust turbine has been incorporated in the 4-cylinder, triple-expansion engine.

The second East Asiatic ship of the Amerika type, the Europa, has now been delivered by Burmeister & Wain for the monthly service between Copenhagen, Southampton, and California, and on trials attained 16.55 knots in a light condition with the machinery developing slightly over 7600 brake horsepower. The power plant is identical to that in the Amerika and consists of a single 6-cylinder, 2-cycle, double-acting, Burmeister & Wain diesel having a bore and stroke of 620 millimeters and 1400 millimeters and weighing 360 tons. All the auxiliaries and scavenging blowers are electrically driven, power being supplied by three single-acting, 2-stroke, Burmeister & Wain engines having an output of 600 brake horsepower at 300 revolutions per minute and directly coupled to 365-kilowatt dynamos. It is understood that the intention of the East Asiatic Co. is to ultimately operate its Californian service with three ships of this type, the order for the third, as previously mentioned, now being under negotiation, if not already placed; and when delivery is effected, probably in the spring of next year, the India will be withdrawn and transferred to the Eastern service via Suez, for which she was originally intended. The Europa is practically identical to the Amerika with the exception of a few modifications to the passenger and cargo accommodations and the adoption of an Oertz-type streamline rudder.

The Westfal Larsen ships have been ordered from the Netherlands Shipbuilding Co. of Amsterdam and are to be single-screw vessels with dimensions 456 feet by 61 feet by 39 feet 10 inches, the deadweight being 9500 tons on 26 feet 10 inches draft. The propelling units will be of special interest as they are to consist of 6700 brake horsepower, double-acting, 2-stroke engines of the A.E.G. Hessleman airless injection type, built under license in Holland, which will give a service speed of 16 knots at full load. Limited passenger accommodation for 12 persons is to be provided, the deck equipment is to include 18 electric cargo winches, and 100,000 cubic feet of insulated space is to be arranged.

The new passenger motor ship Macdhui for the Burns Philp service between Australia and the Pacific Islands, although of moderate dimensions, is noteworthy in many ways, as extensive passenger accommodation is provided in conjunction with a single engine of comparatively high power, which is still further proof of the increasing faith of shipowners in plants of this description. Having dimensions of 340 feet by 51 feet by 31 feet 6 inches to shelter deck, the Macdhui has a deadweight capacity of 3200 tons and carries 138 passengers. The 8-cylinder Kincaid-Burmeister & Wain, 4-stroke, single-acting diesel is pressure charged and has a rated output of 4700 indicated horsepower for maintaining a 14 to 15 knot schedule. It is of interest to note that the owners are in the market for a new ship which will probably be motor driven to replace their steamer Makambo and as their other diesel ship, the Malabar, built in 1925, was recently lost, it is not unlikely that two orders will be placed.

Another noteworthy ship destined for operating in Pacific waters, although in the extreme southerly latitudes, is the whaling factory Kosmos II, recently launched at Belfast by Workman-Clark for Norwegian owners and partly financed by a loan from the Government of Northern Ireland. This huge structure, which is one of the heaviest pieces of work so far turned out by the builders, has the distinction of being the largest craft of its kind in the world and has an over-all length of 600 feet, a beam of 77 feet, and molded depth of 53 feet. The factory is situated in the upper 'tween deck which has 15 feet of headroom and includes the latest flensing and boiling plant capable of dealing with about 2500 barrels a day. The cargo tanks have a capacity of 25,000 tons, while the total displacement is 34,000 tons. The propelling plant maintains $11\frac{1}{2}$ knots and consists of twin sets of quadruple-expansion engines taking steam at 250 pounds from five single-ended, Scotch boilers equipped with oil-firing, superheat, and forced draught.

The Orient-Transpacific service will also shortly be augmented by the addition of two interesting motor vessels belonging to the Netherlands Steamship Co. These craft, the Salawati and Saparoera, were originally triple-expansion propelled steamers of 6700 tons gross and 420 feet in length built in 1920, but owing to the repowering of the same owner's passenger liner Pieter Corneliszoon Hooft it was decided to remove the steam plant and install one of her original 4000 brake horsepower, 8-cylinder, Sulzer diesels in each vessel. This has now been accomplished and, as the power has been increased from 3600 indicated horsepower to a corresponding rating of 5000 indicated horsepower, the service speed has risen from $12\frac{1}{4}$ to $13\frac{1}{2}$ knots.

The other large Dutch shipping company trading to the Orient via Suez, the Rotterdam Lloyd, is also increasing the power of one of its passenger liners the Indrapoera, and it is understood intends to fit the original machinery in two cargo vessels now building for service between San Francisco and the Dutch East Indies.

The turbo-electric coastal liner for the Union Steamship Co. of New Zealand service between Wellington and Lyttleton, referred to in the April issue of Pacific Marine Review, has now been launched as the Rangatira. Dimensions are 400 feet by 58 feet by 29 feet, and the ship will be extremely handsome in appearance, with a well raked stem and cruiser stern, two stacks, and two pole masts. Accommodation will be arranged for 720 first and 236 second-class passengers.

The rapidly increasing size of ships trading to Pacific waters incidentally affects docking facilities, and one of the most important events in this connection has been the launch in sections of the new floating dock for Wellington, New Zealand. This has been built on the Tyne by Swan Hunter and Wigham Richardson and has an over-all length and breadth of 584 feet and 117 feet 6 inches, the inside clear width between fenders being 88 feet. The lifting capacity is 17,000 tons, and the dock can be lowered to a depth of 26 feet over the keel blocks. Sinking and lifting operations will be controlled from a valve house on the starboard wall amidships by an electro-pneumatic system, and the equipment includes the latest types of mechanical bilge blocks and side shores, whilst telescopic sights are to be installed to accurately measure any possible deflection.

Editorial Correspondence

Some Condenser Experience

IN connection with several articles on condenser problems that have appeared in Pacific Marine Review during recent months, the following communication from an experienced marine engineer is of considerable interest.

Editor, Pacific Marine Review. Dear Sir:

Please permit me to express some thoughts on condenser troubles on shipboard—thoughts inspired by the reading of several articles that have recently appeared in your excellent journal. I thoroughly agree with the writer of the series of articles on "Condenser Problems" in his contention that faulty condenser design, design of water boxes, and arrangement of circulating water pipe connection, also steam circulation are responsible for much of the corrosion and tube splitting difficulties with which marine engineers have to contend. In fact, I have collaborated with Mr. Graham Smith in correcting condenser troubles in some of the vessels that have been in my charge and have found his advice and assistance uniformly correct and valuable. The basic technical ideas underlying the condenser cures suggested in these articles will, if intelligently applied, clean up the major difficulties experienced in many condensers afloat.

I cannot agree, however, with the anonymous article entitled "A Condenser Tube Experiment" and published in your May, 1931, issue. This article records the Shipping Board experiment of installing tubes expanded into the tube sheet at both ends in the condenser of the steamer Bakersfield and made tight without packing. On the first voyage, two tubes had split and on these being plugged no further troubles (as gauged by tests for salinity in the condensate) had developed during the first year.

I have followed for years all the modern ideas with regard to the rolling or expanding of tube ends to make a tight fit in the tube sheet. It is an operation requiring the use of special tools and considerable experience and skill. Otherwise there will be direct injury to the tube or tube sheet and the setting up of internal strains in the tubes and tube sheet resulting in injury later.

Though it states that "the necessary funds were appropriated" to make the change in the Bakersfield's condenser, I note that the article gives no figures showing the amount of these funds or of any difficulties that might have been experienced in the installation of the tubes. In other words, it would be interesting to know whether or not this was a strictly commercial job, especially in view of the fact that all commercial manufacturers building condensers depending on expanded tube ends for tightness have always found it necessary to provide some means of compensating for tube expansion.

As a practical operating man, I was much interested in the comment in the report of the chief that the two split tubes had "not been removed from the condenser due to the necessity of removing the main heads to accomplish this work." This brings up one of the many practical differences between marine and shoreside power plants. A well designed power plant ashore will have ample room available for pulling anything that it may be necessary to pull and ample skilled labor to make a speedy and efficient job of breaking out and replacing.

A commercially well designed power plant afloat, particularly on a freighter, is usually rather cramped for space (all possible space being reserved for cargo) and skilled labor available afloat is limited to the operating crew. Therefore the design of the various units must be such that emergency repairs are easily effected while at sea.

In the power plant of which I am chief, a power plant similar to that of the Bakersfield—quadruple expansion reciprocating engine and Scotch marine boilers — we are having excellent condenser results through the use of tubes packed flush at both ends with John Crane endless ring metallic packing.

Both in Pacific Coast and Atlantic Coast harbors there is considerable contamination of water at the docks from sewage and other causes, and I notice that we have far less trouble at dock since installing John Crane endless metallic ring flush type packing than we had in the old days with ferrules and lacing. The projecting ferrules would often be very badly corroded during a few days in port.

I would like to hear more of the actual experience of the Bakersfield at sea and in port with this expanded-tight nonpacked condenser-tube set-up.

Yours sincerely,

(By request we are withholding the name of the writer and that of his ship.)

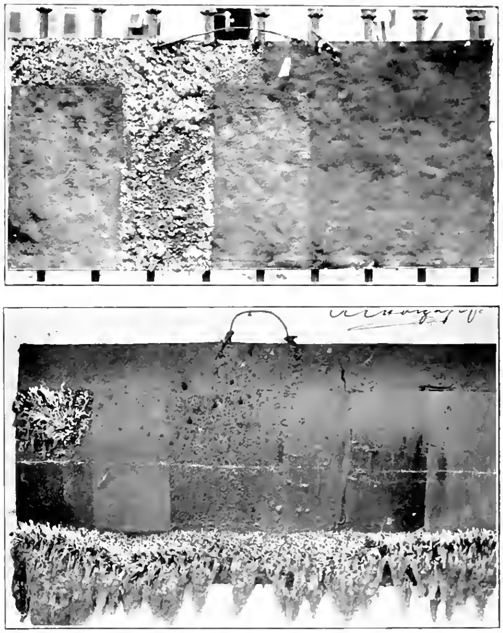
Fouling of Ships' Bottoms

Editor, Pacific Marine Review. Dear Sir: Referring to an article on "The Fouling of Ships' Bottoms" by E. Perry, may I be allowed to correct a few of the points to which he refers?

In quoting from the Royal Naval College of Great Britain, he is evidently dealing with a quotation dating forty or fifty years back. This report contains the following sentence:

> "As a rule, care is taken to select fairly good varnishes to resist the action of sea water, and it may be two or three months before they become sufficiently disintegrated to allow the sea water to dissolve any of the poison," etc. and later—"The poisons in the coating are locked up in their restraining varnish and thereby rendered inactive."

The problem for the manufacturer of compositions is to manufacture an antifouling paint which will **act at once**, and, as a matter of fact, the principal manufacturers of this commodity (who stand in the forefront of their trade) solved this problem more than twenty years ago. I am enclosing some photographs of experiments which I made in Genoa between the years 1897 and 1906, in which I solved this problem. These were all stationary plates and those which fouled were coated with varnishes which did not allow the poisons to act, while those which kept clean, and this



Two photographs of experimental plates used in tests at Genoa, about the year 1900, showing the effect of varnishes which had then been developed for releasing antifouling poisons.

for a period of several months under very fouling conditions, were made with varnishes which enabled the poisons to immediately enter into combination with the sea water and to destroy the germs of barnacles, grass, etc., in their initial form before they could attach themselves. You are at liberty to reprint these photographs, if you like. Before that time different varnishes were used which did lock in the poisons, so that a vessel newly painted and exposed to severe fouling in a tropical port often was covered with barnacles while loading and returned home foul.

Another point which is also very antiquated, to which I take exception, is the following:

> "In the judgment of naval and marine engineers, no other priming paint in the marine field has been as successful as a paint of pure red lead and pure linseed oil."

This has been found to be absurd nonsense. If you put an antifouling paint over a red lead priming, both the red lead priming and the antifouling paint disappear within a few weeks, unless the red lead has had at

(Please turn to Page 375)

Notes on the Electric Drive

An Account of the Development of Electric Gearing for Marine Steam Turbines in the United States Navy and Merchant Marine

By H. L. Seward

IT is a curious fact that every available prime mover lacks a completeness of those characteristics which make it suitable for the direct driving of a screw propeller. A screw propeller may be considered as an axial reaction pump without a casing. Its main function is to discharge a column of water astern. The application of power to a screw propeller involves curious interactions between speed, thrust, and twisting moment, depending on conditions external to the propeller.

It is clear that the propeller should be considered as a form of dynamometer which gives useful propulsive results depending on rather involved external and internal conditions.

The reciprocating steam engine and the propeller were developed together; but the former has, especially in the larger sizes, felt the heavy hand of obsolescence due to the perfecting of the steam turbine.

While the steam turbine has the very desirable characteristic of providing a constant turning moment, or torque, it must run at high speeds to be efficient. Faced with the need of a device to reconcile the slow speed of the propeller with the desired high speed of the steam turbine, the past twenty years have seen some interesting developments in speed reducing devices. These may be hydraulic, mechanical, or electrical in form. The former has seen but a limited development, but the mechanical and electrical types have made very satisfactory progress in application.

It is not the purpose of this article to discuss mechanical reduction gears for their position is so well established that they provide the one best solution of the problem in many cases. The double reduction gear permits of smaller turbines running at higher speeds and the good records being made by this form of drive at the present time point to further satisfactory development and application of this type. Single reduction gears in multiple series, such as are being built for the new 700-foot United States Lines' ships, hold high records for economy and have the distinct advantage that operating personnel with mechanical ability feel rather secure in operating or maintaining them. The mechanical and electrical reduction gears have both been so well developed that either type could be used on practically any type of ship. It is necessary, in any given study, that all costs and efficiencies be considered.

The electric drive is distinctly an American development. The American Bureau of Shipping has classed more than 180,000 gross tons of American vessels of this type (2000 gross tons and over)and there are about 85,000 gross tons of American vessels (2000 gross tons and over) being built with this form of drive today. The fact that this number includes those ships which are the optimum of American creation to date calls particular attention to the position achieved by the electric drive. It is interesting to note that the American Bureau of Shipping is the first and only classification society, as far as known, to prepare rules for the classification of electric drive machinery. These were prepared several years ago after consultation with experts and builders of this form of drive.

The United States Navy in 1912 made a distinct contribution to marine engineering when the colliers Jupiter (electric drive), Neptune (mechanical reduction gears), and Cyclops (reciprocating engines) were designed. It was the satisfactory record made by the Jupiter, now the airplane carrier Langley (fondly known in the service as "the covered wagon") that caused the decision to install electric propulsion machinery on the six capital ships New Mexico, Maryland, Colorado, Tennessee, California, and West Virginia, as well as the two airplane carriers Saratoga and Lexington. The Jupiter is a twin-screw vessel designed for a speed of 14 knots with 5500 shaft horsepower at a displacement of 19,230 tons. On her trials she developed 7150 shaft horsepower and made 15 knots. The New Mexico is a quadruple-screw battleship having a displacement of 32,000 tons at 30-foot draft, commissioned in 1918. She was designed for a speed of 21 knots but made 21.31 knots on standardization and developed 31,300 shaft horsepower at 170 revolutions per minute of propellers and 2070 revolutions per minute of main generators. The Lexington and Saratoga are 33-knot, quadruple-screw, airplane carriers of 33,000 tons displacement, 888 feet length over-all, beam 105 feet. There are four 35,200-kilowatt steam turbine generators with eight propulsion motors, connected in pairs to the four propeller shafts which turn at 317 revolutions per minute for full power. While they are rated at 180,000 shaft horsepower, a substantial increase in this power was developed on the trials.

This rapid development of the electric drive in the Navy was, of course, watched with much interest by those responsible for design and operation of our merchant marine vessels. The navy had the advantage of the necessary resources, a scheme of training a personnel which is ample in number if measured by merchant marine standards and an argument for maneuverability, full backing power, subdivision of compartments, and a unity of purpose in design which places their problem apart from and beyond the problem of the merchant ship designers. While the navy's ships are required to produce full power for but a few hours per year, their operation established the electric drive as reliable, flexible, and smooth in operation, although no conclusions as to costs of maintenance and repairs could be drawn. One interesting by-product has been the accurate and instantaneous measurement of power supplied or demanded by the propeller under maneuvering conditions. When the rudder is put hard over the changes in torque demands by the inboard and outboard screws can now be visualized because of the electrical measurements. Our mechanical measurements of mechanical power had never been quick enough during those first few seconds of a sharp change in course. The extra power demands of a heavy seaway may also be ascertained by the electrical measurements. Motors and shafting can now be designed with a better knowledge of the torque demands. One has but to stand in the engine room and watch the almost instantaneous response of the main motors to all signals, regardless of what the ship itself may be doing, to realize that a new school of ship-handling for deck officers becomes possible because of the quick changes in thrust which can be produced.

The United States Coast Guard has done important development work on the electric drive. The ships of this service are small cruising gun-boats about 250 feet long, making 17 knots with 3000 shaft horsepower. The storms which keep other vessels in port are often the cause of the Coast Guard cutters putting to sea in answer to calls of distress. They go looking for the icebergs which other ships hope to avoid because of the information faithfully furnished by the cutters. In the forgotten seas of the North these vessels are the whole United States Government. They must always keep to the sea—and keep within limited appropriations not inflated by war enthusiasm.

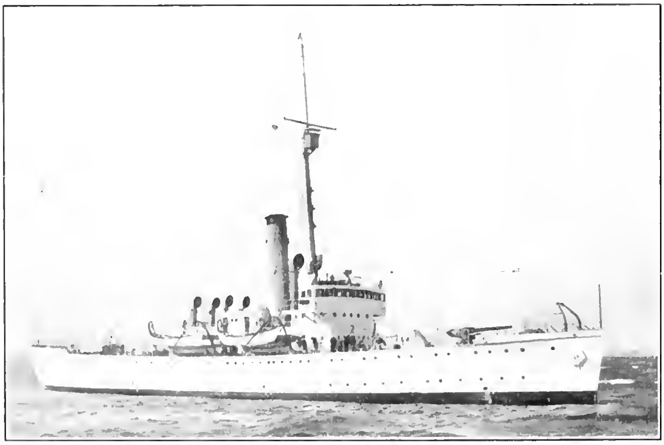
In 1920 the first turbo-electric installations in the Coast Guard were made by the General Electric Company on the cutters Tampa, Haida, Mojave, and Modoc. These ships were the first for which a synchronous motor was adopted to drive the propeller. While their machinery was in progess of development it was proposed by Captain Newman that some of the auxiliary machinery be driven by current from the main generator. It is of interest to note that the contractors for the machinery refused to develop this idea for two reasons, which at the time were valid, turbo-electric propulsion in as low power as 2600 shaft horsepower had never been used and the synchronous motor was being employed for propulsion for the first time. It was considered inadvisable to allow unrelated problems to influence the success or failure of the new style of main machinery.

All of the auxiliary machinery for the four cutters was therefore of conventional steam driven types, known to be extravagant, but not even suspected of being bad enough to have a marked effect on the whole plant. And so when the four ships of the Tampa class failed to live up to expectations as to fuel consumption, it was decided to conduct thorough performance trials of all machinery separately and then of the plant as a whole.

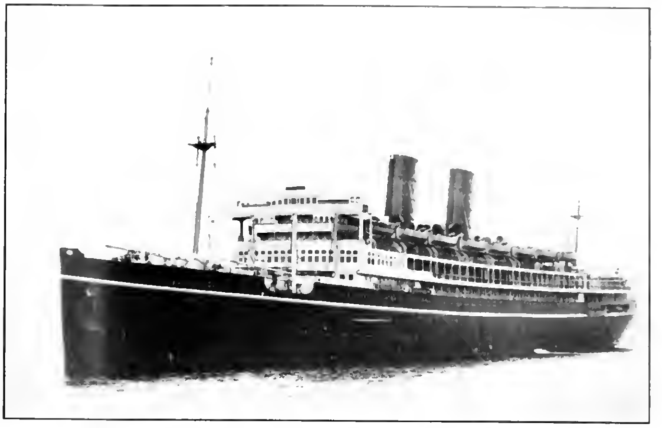
The Modoc was selected for the tests and the trials were run in August 1923. The results were astounding. At full power 32 per cent. of all the steam produced was being used by auxiliary machinery, and more at lower powers. In fairness to the auxiliaries it should be stated that they were exhausting against eight pounds back pressure, and that some of the heat in the exhaust steam was recovered in the feedwater heater and in the low pressure stages of the main turbine. The results of the Modoc trials were presented as a paper before the Society of Naval Architects and Marine Engineers in November 1923.

In 1925 the Great Lakes ore ship T. W. Robinson, of the Bradley Transportation Company, was fitted with a partial application of the idea that electric auxiliaries should receive power from the main central power plant and thus became the pioneer ship with this type of machinery.

An appropriation in 1926 made possible the signing of contracts in 1927 with the Westinghouse Electric and Manufacturing Company for the machinery of the five newest Coast Guard cutters, Chelan, Pontchartrain, Tahoe, Mendota, and Champlain. These vessels resemble as much as possible the central power house idea afloat in that they are electric-drive with as much of the auxiliary power as is at present possible being derived from the main turbo-generator. The propelling machinery of these five Coast Guard cutters consists of the main turbo-generator, 2500 kilowatts at 3600 revolutions per minute; the synchronous propelling motor which develops 3000 shaft horsepower at 163½ revolu-



A firm believer in the turbo-electric drive is the United States Coast Guard Service, which has standardized on the type of cutter shown here with auxiliary electric power derived from the main turbo-generator.



Great Britain has been slow to accept electric gearing for steam turbines. Here is shown the Viceroy of India, which has been in operation for two years so satisfactorily that two sister ships are now on order.

tions per minute; and the necessary control panel which contains the maneuvering switches and speed control. The auxiliary circuit is tapped off from the high voltage terminal of the main generator and is led directly to a power transformer which reduces the voltage to 230. The circuit is led from the low voltage terminal of the transformer to a disconnecting switch and a circuit breaker on the auxiliary switchboard, and from the circuit breaker to the alternating current motor of one of the generator sets previously referred to. An auxiliary steam turbine is connected through a speed reduction gear to the motor generator set and furnishes power to the generator at all times when the circuit between the main and auxiliary systems is open.

The acid test of all engineering matters is supplied by experience and it is still too early for final judgment. The Chelan, the first of the new ships, had her trials in July 1928 and since then has cruised many thousands of miles with complete success and with a marked improvement in fuel consumption as compared with earlier ships. Elaborate trials were run on the Pontchartrain, which was the second of the new ships, and the performance of all her machinery was measured with a high degree of precision. A complete report of her trials was presented before the Society of Naval Architects and Marine Engineers in November 1928, by Captain Newman.

The two ships are comparable as to size, tonnage, power, speed, boilers, and propelling machinery. Refinements have been made in hull design of the Pontchartrain, and she is fitted with a contra-propeller for rectifying the propeller stream. She operates on steam at 250 pounds (gauge) pressure and 250 degrees Fahrenheit, superheat, whereas the Modoc has 200 pounds and 90 degrees. All these are very real improvements and make for reduced operating costs. But the outstanding fact of all is that the Pontchartrain auxiliaries take only 25 per cent. as much steam as those on the Modoc.

In the comparison of machinery of ships it is customary to consider fuel consumption for all purposes in pounds per shaft horsepower per hour referred to the propeller shaft. This figure for full operation is: Modoc 1.195, Pontchartrain 0.823; for cruising speed Modoc 1.535, Pontchartrain 1.079. At no time has there been recorded a failure of the machinery of these ships.

Capital investment is always a matter of much concern to ship owners. For the Pontchartrain class of ships the total cost of machinery and boilers f.o.b. factory was $173,000 per ship, which included all machinery except windlass capstan, steering gear, and quarters ventilating fans.

The performance of that fine trio of Panama Pacific Line ships, the California, Virginia, and Pennsylvania, has been watched with much interest by all concerned in merchant ship design and operation. The performance of the new Morro Castle and Oriente of the Ward Line is fully as satisfactory. Passengers report a comfortable relief from vibration. Economy and upkeep records have been very satisfactory. A student of the design of their propelling machines will observe that experience with plants previously developed has been incorporated with particular reference to the requirements of cargo and passenger vessels. They are twin screw ships with two turbo-generators so arranged that each generator may drive its propeller motor, or either generator may drive both motors for lower powers or inspection. The adoption of the induction-synchronous motors similar to the Coast Guard type has produced a simpler control system which is so interlocked as to be practically foolproof. Electric auxiliaries both in the engine room and on deck maintain those American standards of accessibility, neatness, standardization and better working conditions which are so noticeable ashore in our power-plants and factories.

Interest is now centered in the new Dollar liners President Hoover and President Coolidge. These will be twin-screw, 20-knot ships of 23,000 gross tons, 653 feet length over-all, beam of 81 feet, and a molded depth of 52 feet. Each motor is rated at 13,250 shaft horsepower at 133 revolutions per minute. The two main turbo-generator units are each rated at 10,200 kilovolt amperes. These ships will be called on to cruise at slow speeds for a considerable length of time in order to arrive at ports of call at a certain hour or to make satistory connections at points of interest. Turbo-electric drive is particularly well adapted to this type of service because of its flexibility in giving one turbine a more economical load in driving the two motors. The ultimate value of the cost of a passenger or ton-mile cannot be determined until the ship shall have demonstrated her length of useful life which is now unpredictable, but it is hoped will be long and economical of upkeep.

Marine Engineering Management

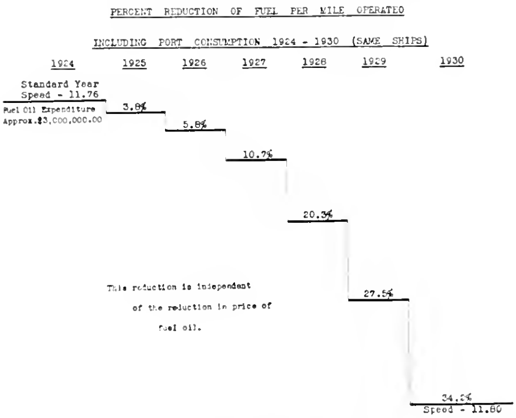
Some Experiences of the Marine Department of the United Fruit Company in the Application of Personnel Psychology to Operating Problems

By H. Harris Robson, Manager
Marine Department, United Fruit Company

ECONOMICAL operation of a Marine Department depends upon two important factors, mutually dependent upon each other—intelligent management and scientific engineering. A combination of these utilized by the Marine Department of the United Fruit Company produced the results indicated in the graphs illustrating this article.

A careful analysis of these graphs shows that the personnel is the vital factor in securing the economies produced. Dealing with the personnel is hence the most important factor in this administration.

To outline the details of the management that resulted in the economies shown, it is necessary that the beginnings of the plan be described. The initial step was to survey the existing equipment and personnel, following this with periodical surveys. The survey revealed that before any changes could be made effective it would be necessary to gain the confidence of the personnel in the engineering ability of the management and to obtain the respect of the personnel by fair and square dealing.

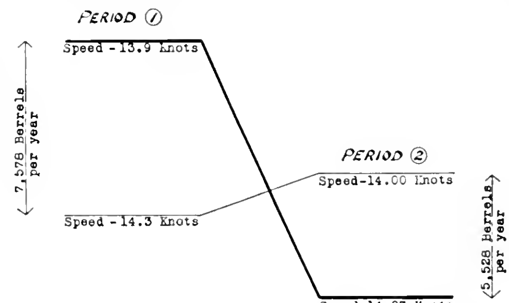


The above graph illustrates the reduction in fuel oil per mile operated, including port consumption and fuel for all purposes. It includes only ships that were in operation during the entire period. Maintenance and supply, exclusive of fuel, show a reduction of 9 per cent. for the same ships for the same period.

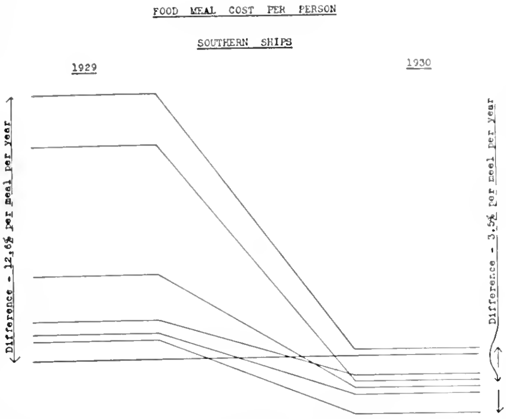
Engineers as a body deal more with facts than with any other commodity and they probably deal with facts more than does any other profession. The first test an engineer applies to his superiors is evidenced when he asks for a proved fact in answer to an engineering problem. To gain the confidence of the engineers it was shown that the management was capable of supplying practical and definite solutions for their problems. In some instances it was evident that the questioner knew the answer before he asked the question. This was the personnel applying the acid test to the management. However, they had been invited to submit their problems and the invitation was accepted with avidity. There were times when we almost wished we had not been so extravagant in our offer. From engineering problems attention was directed to problems of organization. The men were informed: "Ability is the prime factor for promotion. Personal friendship, politics, or pull are entirely discounted. We are here to see you give the United Fruit Company a square deal. We will see that you get a square deal in return." Much of the confidence and respect gained has been due to the fact that the management has never successfully been crowded, has never been partial to anything but merit, has never made a promise and not fulfilled it, and at no time has issued an order and not enforced it impartially.

A plan for an even flow of maintenance costs that would not increase expenditure yet would increase the mechanical efficiency of the equipment was outlined.

To secure from a personnel the successful consummation of a plan requires that one impress clearly, vividly, and concisely the details one has in mind and secure recognition of their feasibility. Hence the next step was to convey the new methods to the personnel, and by personal interviews to impress upon them the fact they would participate in any distinction gained by the effectiveness of proposed methods. It was further impressed upon them that they were having placed in their hands the opportunity to establish themselves as a highly efficient part of the United Fruit Company organization. We were presenting to them an ethics of achievement in place of an ethics of consolation. Bulletins of full operating costs and fuel consumption of the ships were furnished to each ship.



This diagram illustrates graphically the effect of personnel in steamship operation. The only difference between Period 1 and Period 2 is the switching of the entire personnel from one to the other of two sister ships. Result: The slow ship became a fast ship with a tremendous saving of fuel.

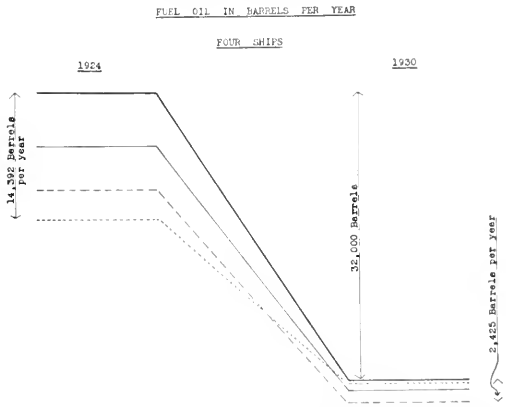


This graph represents the improvement in fuel oil consumption of four sister ships on the same run.

This not only kept each ship's personnel conversant with the operating cost of their own ship but also revealed to them the conditions on other ships. This created a spirit of competition among the ships and among the divisions.

Gaining the confidence and respect of the personnel produces a condition that makes possible the enthusiasm essential for obtaining the desired results. The prime essentials, however, are the management's own enthusiasm and the recognition by the men that this enthusiasm is insistent and unwavering. To stimulate the interest of the men necessary to reach the established goal, one must determine the limits within which the men will work with zest, spirit, and pride of accomplishment rather than how far they can be driven to this end. The methods employed in maintaining enthusiasm may be briefly indicated. The publication in the Unifruitco Magazine of the names of the ships leading in economical operation was one step. An appreciation of the effort of the Marine Department by the president of the company, published in the Unifruitco Magazine, revived a flagging interest. The recognition of a good performance led others to desire to emulate that performance. An improvement in equipment in one division prior to its installation on other divisions incited that division to take full advantage of it before others received it. The curiosity of the engineers to know what the next step was to be kept them on edge. Thus enthusiasm was maintained by linking up such native interests as imitation, emulation, acquisitiveness, and curiosity with the desire to participate in an accomplishment.

With the personnel functioning efficiently, the prime requisites of management enforced, attention was turned to equipment and methods of use,— in other words to the factors of scientific engineering. G. W. Grupp, Transport Consultant and Professor of Economics at Webb Institute, writes in the "Nautical Gazette" for January 10, 1931: "As a steamship increases in age its value transferred into operating efficiency decreases as evidenced by, one, large repair costs; two, increased fuel consumption; three, reduction in speed." In the case of the United Fruit Company none of these occurred; our repair costs are steady, our fuel consumption has been reduced, and we have slightly increased our speed. This contention is not at variance with Professor Grupp's contention. His statement is fact. Its application to our results reveals that the trend toward the condition he indicates may be near at hand or far away according to the conduct of the management. The results established by the seagoing personnel of the United Fruit Company are all the more creditable when it is realized that no major alterations have been made in the equipment. The same engines, boilers, and refrigerating machinery have been maintained throughout our program. There has been no increase in main-



A graph showing how the food costs on seven sister ships were improved by one year's application of the methods described in the article.

tenance cost; therefore the fuel economies have not been paid for by increased maintenance costs. Similar fuel oil economies could have been arrived at by scrapping the existing equipment and replacing it with more modern high pressure boilers and turbines. Had this been done it would have required years of the fuel economies to pay for the new installation; under present conditions we have no increase in maintenance cost, therefore fuel economies represent money saved. Above all, we have created an organization that is of inestimable value to this company and to the American merchant marine.

Fouling of Ships' Bottoms

(Continued from Page 370)

least six weeks to dry. As a matter of fact, the United States Navy Department has a standing rule that no antifouling paint may be put over red lead on ships' bottoms unless the red lead has dried for at least six weeks, and this puts red lead out of the running. Unfortunately, many marine engineers and naval architects have not been sufficiently cleared up on this point and still specify red lead as a first coating on scaled ships' bottoms, with the almost invariable result that on redocking all the paint has disappeared. If they took the advice of the firms who supply the antifouling paints for the ships, they would save time and money and obtain better results.

Your very truly,
A. C. HOLZAPFEL

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part IX — Packing and Handling

By L. L. Westling

SUCCESSFUL transportation of perishables demands not only perfection of equipment, but utmost co-operation of everyone concerned, from the producer to the consumer. Oftentimes, the various agencies through whose hands the commodity must pass are indifferent or their interests are not those of the other members of the marketing chain, and the result is a handicap for the rest.

The carrier usually occupies a delicate position in the movement of perishables. The shipment falls into his hands while yet fresh from the producer, and any unfavorable condition existing between harvest or manufacture and delivery at the ship's side usually will not become apparent until after the commodity has been several days in the refrigerated chamber. Over-ripe fruits and vegetables are certain of poor delivery for the reason that refrigeration does not stop the maturing or ripening process but merely retards it. The carrier often finds fruits over-ripe and breaking down after having received them in apparently perfect condition. Field diseases also are frequently not apparent until several days after harvesting, and these hasten the maturing processes.

Rough handling is responsible for excessive losses of fruits and vegetables. Owners' opinions of what constitutes "commercial handling" may vary widely and too often damages result.

The effect of harvesting methods are reflected in Table 2 of the United States Department of Agriculture Bulletin No. 601, as follows:

Treatment of Lettuce	At Withdrawal: Carefully cut	At Withdrawal: Commercially cut	Three days after withdrawal: Carefully cut	Three days after withdrawal: Commercially cut
Nonprecooled:				
Heads showing slight drop rot	7.9%	24.2%	11.7%	30.3%
Heads showing medium drop rot	.9	16.9	3.3	19.6
Heads showing complete drop rot	0.0	3.4	.3	5.9
Total drop rot	8.8	44.5	15.3	55.8
Precooled:				
Heads showing slight drop rot	4.7	20.6	8.5	26.8
Heads showing medium drop rot	.4	6.3	1.4	8.3
Heads showing complete drop rot	0.0	.3	0.0	1.6
Total drop rot	5.1	27.2	9.9	36.7

Packing Perishables

The producer makes an effort to deliver his goods to the jobber in good condition. The packer is anxious to pack his crates or boxes with good materials. At this point their responsibilities and interest often cease and others become involved in the market chain. The packer, of course, may not know whether the shipment he is preparing is intended for immediate local consumption or whether the commission merchant will export it. If it is to be exported, proper maturity of the commodity is an important factor; and the method of packing and type of crate should also be given intensive study. Cost of shipping space often prompts too tight packing, to the detriment of air movement in the commodity while under refrigeration.

The United States Department of Agriculture has conducted a research in the packing of celery in the standard crate, the small crate, and the ventilated crate. The small crate, ventilated, excelled by far in the preservation of the plant under refrigeration, as shown in the following from Bulletin No. 579, Table XI.

Type of crate	Grades (percentage): Sound	Slightly decayed	Badly decayed	Worthless
Standard	46.25	42.88	9.0	1.8
Partition	73.10	23.12	2.9	.73
16-inch (for three years only)	74.14	22.10	3.18	.58
14-inch (for three years only)	78.88	18.00	2.28	.70
11-inch solid head (for two years only)	72.66	21.83	4.75	.86
10-inch (for one year only)	97.00	3.00	—	—

For preservation of most commodities, it is necessary that they be so packed that the gases may be given off and the chilled air find its way to the center of the crate.

Lettuce Pack

Another example of influence of packing on preservation is found with lettuce. The usual procedure is to pack the lettuce with approximately thirty pounds of crushed ice. The melting ice and the deteriorating effect of excess water has given the carrier much annoyance, both relative to physical conditions within the refrigerated spaces, and with respect to cost of claims. Lettuce, like a few other vegetables and fruits 'gas' but little during the ripening processes, consequently venting is unnecessary. This vegetable has a very high water content, which, if allowed to evaporate, will cause a wilting and general drying out. One way to retain the natural water in the plants is to pack in an air-tight, moisture-proof, fiberboard box. This builds up a saturation point within the container that is unaffected by the drying effect of the coils. Such method requires precooling before packing and the cost is perhaps higher than that of ice packing; but for export use the result more than justifies the cost.

Meats

Meats are carried generally as chill or in a frozen condition. When chilled meat is received at the ship's side, it should be closely examined by some one familiar with this commodity. The wrapping should be examined and any irregularities, such as the appearance of mould, should be protested. The meat should be loaded aboard with greatest dispatch and under no consideration should it be stowed in a vegetable room, or where the humidity will likely be high, unless at the shipper's risk. Chill meats should never be stacked, but suspended from meat rails. Temperatures should be kept very steady, as variations are conducive to the formation of mould. When cargo of any description, through faulty regulation, is allowed to become colder than the enveloping air, moisture will be precipitated on its surfaces or it will "sweat." This is due to the passing of the "dew point" of the air.

Frozen meats should be watched closely upon delivery to the ship. Beef which has been frozen too rapidly may not be deeply frozen, which condition is detected by a prod, or a spear thermometer. When proved acceptable, it should be quickly stowed and may be piled or stacked in tiers, making sure that some circulation of air is provided about the carcasses. Meats suffering from alternate freezing and melting will develop mould readily. This first appears under the ribs, along the back bone and under the skirt. Each carcass should be examined and protests made if not satisfactory.

The carrier should never be asked to freeze meats unless he is paid accordingly. The specific heat of beef is 0.77, and the latent-heat of fusion (which must be absorbed in freezing) is 102 B.T.U., which means that it requires 4.7 times as much refrigeration to freeze meat without temperature change than it does to lower its temperature from 60 to 32 degrees. However, once the meat is frozen, little or no heat can be removed and the only refrigeration load is that from heat leakage through the insulation, which is not more than if the chamber were empty. It is well to remember in the settlement of claims for frozen meats that the air temperature indicated on the recording thermometer is not necessarily the temperature of the cargo and the differential has no relative immediate effect upon the meat. The frozen beef referred to above must loose its latent heat of fusion before melting or a damaging temperature change can be had within the meat. Of course, the first and quickest melting takes place on thin sections of the carcass, such as the skirt.

The responsibility of the ship owner continues until the consignee has accepted the shipment; hence it behooves the ship's personnel and the agents to see that consignments of perishables do not lie in an exposed condition after discharge for any dangerous length of time. Many claims have been paid by the carrier because of this condition, which is quite beyond his power to control.

Collecting Perishable Cargo

In the transportation of perishables from the producer to the carrier, many things can happen that affect keeping qualities. Carelessness of freightmen, of draymen, of jobber employees, or others may result in the thawing of frozen goods, wilting of vegetables or fruits, and, most serious of all, in mechanical damage. Abrasion of fruits results in rapid ripening of the damaged ones, which, upon breaking down, contaminate the rest. This damaging effect generally takes sufficient time so that it is usually discovered on the fruit when that commodity is in the carrier's hands.

Another but unusual kind of loss is found in late harvested and frost bitten fruit, which often throws wrongly directed evidence on the carrier.

The responsibility of the carrier begins when the receiving clerks have accepted the consignment and allow it to rest on the pier. If the pier is not equipped with a refrigerated compartment, the cargo should be stowed in the ship's refrigerated spaces without delay.

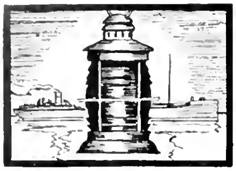
Stevedores who handle heavy castings one minute and perishables the next are often careless in their handling of fruits and vegetables. Oftentimes they are indifferent; and rough handling, dropping, or piercing crates with hooks and improper loading of slings will invariably cause abrasions of the surfaces of perishables. The old proverb of the "one bad apple in the barrel" is apropos, and poor delivery brings claims against the carrier. Close supervision of stevedoring methods is of paramount importance. The Department of Agriculture has clearly determined the effect of careful handling in their bulletins, and the results are astounding. The effect of careful handling of melons is apparent from Bulletin No. 1145, table 2, as follows:

Condition of melons	On unloading Carefully handled	On unloading Commercially handled	Two days later Carefully handled	Two days later Commercially handled
Decayed enough to spoil for food...	0.0%	0.5%	0.4%	6.0%
Molded enough to affect appearance	.5	2.4	.3	9.2
Spoiled for food by bruising only......	*	*	3.5	11.7

*not recorded

Home Again !

The cruiser yacht Infanta, built for John Barrymore by Craig of Long Beach, entering Long Beach harbor after a two months' cruise.



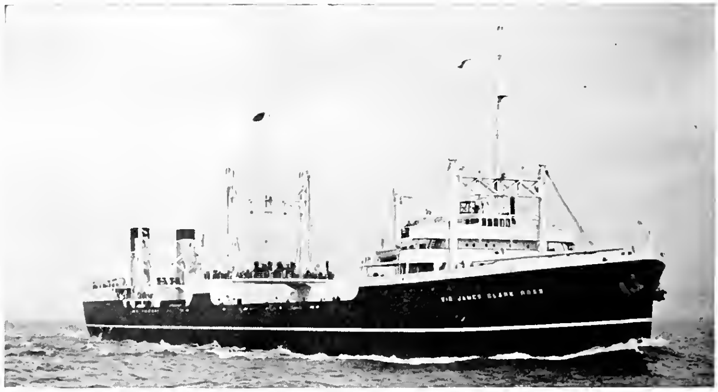
Marine Equipment

OIL PURIFIERS ~ LIGHT WEIGHT PUMPS
AN ADJUSTABLE WILDCAT ~ ELECTRIC TRUCKS

A Mother Ship for Whalers

Large Battery of De Laval Oil Purifiers Used on Motorship Sir James Clark Ross

ONE of the most interesting jobs of marine engineering of recent years is the motorship Sir James Clark Ross, built for Hvalfanger Rosshavet, Sandefjord, Norway, to mother a fleet of whaling vessels oprated by the owner in the Antarctic. The vessel has a deadweight capacity of slightly over 20,000 tons which on the outward voyage from Norway to the Antarctic is utilized to transport fuel oil for her own requirements and for those of a fleet of six or seven 120-foot, steam-driven, oil fired whalers which she mothers. As the fuel tanks are gradually emptied during the eleven months that she is away from home, they are refilled with whale oil, so that upon the return voyage she serves as a transport of this valuable commodity.



Above, motorship and whale oil factory Sir James Clark Ross. At left, the two totally enclosed vapor-proof De Laval fuel oil purifiers serving the main engines of the Sir James Clark Ross.

From the foregoing it is rather obvious that in point of design, the Sir James Clark Ross closely resembles the conventional oil tanker. Indeed, in designing her the owner has borne in mind the possibility that she may spend the latter part of her life as a strictly oil carrier rather than in the service which she now performs. Yet the vessel differs radically from other tankers in that her equipment includes all the apparatus necessary to dissect the sea monsters captured by the fleet, recover the oil which is their most valuable product, and purify it through a battery of seven De Laval oil purifiers.

To facilitate bringing aboard the whales, which weigh from 70 to 100 tons, the vessel has been built with a large opening, or skidway, near the water line at the stern, and the monsters towed to the parent are stropped up and hauled aboard through this opening by means of two 40-ton steam engines. This entire operation takes only from eight to ten minutes.

Once aboard the vessel, the whale quickly ceases to exist as such and becomes merely so much oil. A battery of power-driven saws quickly cuts the carcass into pieces which can be handled by the extracting and refining plant. The residue from this plant is carried by a conveyor system to either side of the ship where it is dumped overboard.

Some idea of the capacity of the oil refining plant may be obtained from the fact that, although the seven De Laval oil purifiers installed in the ship handle only such oil as contains more water than can be removed efficiently by the refining plant proper, these seven machines have a rated capacity of 5 tons of oil per hour each. This makes a total oil purification capacity of 35 tons, or 6250 gallons, an hour.

The Sir James Clark Ross is driven at a maximum speed of nearly 12 knots by two Burmeister and Wain engines of 1900 brake horsepower each, while two 150-brake horsepower engines of the same make drive a 100-kilowatt generator each to supply the electrical needs of the ship. Owing to the necessity of providing a large amount of steam for factory operation, much of the auxiliary equipment is also steam driven and yet it is arranged so that when the vessel is underway and factory operations are at a standstill, all auxiliary equipment may be electrically operated.

The main and auxiliary diesel engines involve the use of three De Laval oil purifiers in addition to those previously mentioned as being used in the manufacturing department of the ship. Two of these are fuel oil purifiers of the totally enclosed type, while the other is used to remove impurities from the lubricating oil.

There are many other interesting features of this floating oil refinery, including provision for launching and landing an airplane to assist the fleet in sighting whales. Powerful searchlights are fitted on the wings of the bridge to aid the fleet in work after darkness, while a battery of flood lights on the cleaning deck, where the whole whales are handled, enables this work to go on at night as well as during the day. Radio apparatus capable of continuously maintaining communication with the home office in Norway is installed and a wireless direction finder is provided.

Again unlike the ordinary tanker the Sir James Clark Ross must provide in her length of 550 feet accommodations for 225 people. This includes the ordinary ship's crew, the factory staff, and the major part of the crews of the small whalers attached to this mother-ship, since these little vessels are left in the Antarctic with only skeleton crews at the end of the eight-month whaling season.

The success of the De Laval equipment on the Sir James Clark Ross is attested to by the fact that orders have recently been received for equipping two similar ships with a total of 26 De Laval oil purifiers.

(De Laval Centrifugal Review)

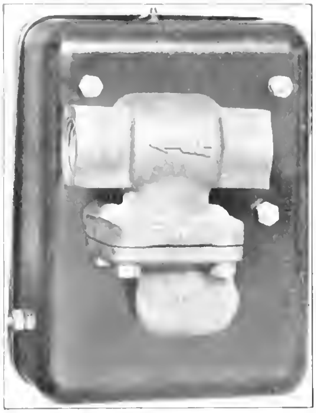
Seven De Laval oil purifiers for removing water from whale oil. Total capacity 35 tons or 6250 gallons per hour.

New Solenoid-Operated Valve

A NEW solenoid-operated valve for controlling liquids and gases under pressure has been announced by the General Electric Company. Some of the many uses for which this new valve is designed are for operating steam or air whistles, for controlling the flow of brine through cooling pipes in cold-storage rooms, for remotely or automatically controlling the supply of oil or gas to furnaces, for automatically controlling the flow of liquids in connection with weighing machines, and for controlling the flow of water in cooling jackets on compressors.

The valve body is made of high-grade castings in two sections with the upper section fastened to the lower by bolts. The threads for the pipe connection are standard pipe threads. An arrow on the upper body casting indicates the direction of flow.

The gland connected to the operating mechanism is of the rotary type which reduces the friction load. The seat and poppet are carefully ground to fit and only high-grade materials, suitable for liquid or gas that is to be controlled, are used. The material is distributed so that a wide seat is obtained, giving long life and reliable operation. The valves can be made normally open or normally closed in the field by drilling the mounting holes in the case and transferring the solenoid and operating mechanisms to the opposite side. The valves are of the unbalanced type and require



View showing valve mounted on solenoid case.

little power for operation. A standard solenoid is used. All of the coils are designed for continuous duty and the solenoids are selected so that there is ample power for operation. The operating mechanism is so arranged that the solenoid plunger is permitted to accelerate without load for a fraction of the stroke, thereby effecting quick, reliable operation.

A sheet-metal case with a hinged cover encloses the solenoid and operating mechanism. Suitable knockouts are provided in the case for conduit connection.

The following are a number of the advantages claimed for this device:

Operating coils are designed for continuous duty.

Valves are of the unbalanced type and require little power for operation.

Valve seats can be ground without removing the valve from the line.

Rotary gland design results in much less wear and friction than are usual with the reciprocating type.

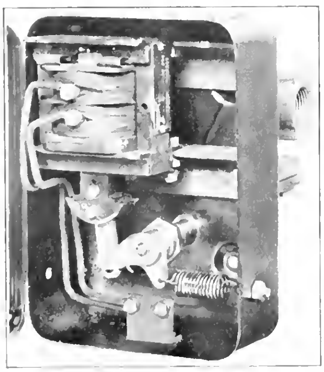
Solenoids have more power than is required to operate the valves. The operating mechanism is so designed that the solenoid plunger accelerates without load for a fraction of the stroke, thus effecting quick and reliable operation.

Minimum number of wearing parts.

Valve seats are wide and designed to provide long life and dependable operation.

Solenoids and operating mechanisms are supported from the main section of the valve-body castings. This sturdy construction removes all strains from the valve seat and operating members.

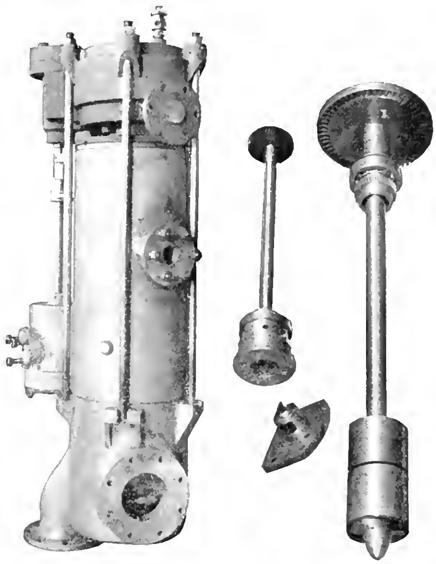
Solenoids and operating mechanisms are enclosed in sheet-metal cases with knockouts suitable for conduit connection.



View of case opened showing solenoid and operating mechanism of the new General-Electric electrically operated valve.

Light Weight Propeller Oil Pump

THE rapid advance in reduction of space and weight of essential marine auxiliaries is exemplified in the new vertical 2-stage marine lubricating oil pump developed and manufactured by the South Philadelphia works of the Westinghouse Electric and Manufacturing Company. It weighs only 400 pounds as compared to 4000 pounds for the conventional screw pump of equivalent capacity and is driven by a direct - connected single disk turbine operating at 7000 revolutions per minute.



Our illustration shows, at the right, the assembled pump ready to connect on shipboard. In the same picture the piece at the right, with the turbine wheel at the top and the two-bladed propeller and guide vanes at the lower end, is the propeller rotating element. The two smaller pieces in the center constitute the governor rotating element.

The design of the pump affords unusual accessibility. By simply removing the five through-bolts the pump can be completely disassembled for cleaning or inspection.

New Electric Tiering Truck

By C. B. Cook

COMPARATIVELY light but bulky objects usually require large areas for storage. This condition demands the utmost utilization of every inch of floor space and head room that is available, with the result that aisles are frequently narrow and congested.

As a result there has been an insistent demand for a medium duty electric industrial truck to operate, transport, and tier in very limited space. To meet this demand, Elwell-Parker has designed a new model specially suited for operation in quarters where ordinary trucks could not be used.

This truck is a three-wheeled ma-

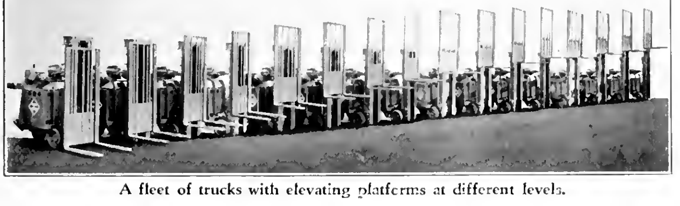
Truck with elevating rack tilted.

chine, steering with a third wheel, so that it turns practically within its own length. Short turning is further aided by tilting the uprights, thereby bringing the load back over the main portion of the truck. This inclined position of the load provides safety for high speed travel, since the load is retained in the inclining position. High speed travel is an important factor in a truck of this character because the loads are not extremely heavy, usually weighing from 500 to 2500 pounds. Another very important feature of this truck is that it will travel through factory, storage, or freight car doorways seven feet in height.

The telescoping feature of the upright provides for the double extension of these uprights, so that the forks supporting the load can travel to an upper limit of 96 inches. This feature permits the stacking of one load on top of two loads, with the result that all head room in the warehouse up to the height of three loads is fully used. The forks may or may not be provided with a back rest, depending upon the character of the goods to be handled.

All of the usual Elwell-Parker standard safety features have been incorporated in this truck. It is built of standardized Elwell-Parker units engineered not only for this type but for other Elwell-Parkers designed for other handling operations. With this new truck, a high platform skid is not required, since the forks need only a 2-inch clearance beneath the bottom of the load. A 2x4, or even lighter, cleat or pallet is all that is required, which again helps in utilizing all available head room. One user of these trucks who tried them out at the start now has a fleet of twenty seven in use, proof of the practicability of the truck in meeting the demands for which it was designed.

Truck leaving pile of tiered merchandise.



A fleet of trucks with elevating platforms at different levels.

An Adjustable Wildcat for Saving Wear on Anchor Chains

DEVELOPMENTS in chain wheels such as wildcats or chain heads for anchor windlasses—also sprocket wheels for marine railways and log hauling purposes—have now advanced to the stage of pitch diameter adjustment. On a recently developed chain wheel made either in the stud-link or long-link type, the wear of the chain or wheel may be taken up or adjusted in a quick and simple manner to maintain a proper chain fit so long as the chain is proper for use. By maintaining a proper chain fit both the wheel and the chain last longer.

The old style, solid cast iron pocketed chain wheels have served their purpose well until the inside ends of the chain links become sufficiently worn to ruin the chain pitch and original fit and then the chain begins jumping the pockets, resulting in more quickly ending its usefulness and hastening its replacement.

In the new adjustable pitch wheel, pitch or fit adjustment can be made in a few minutes without removing the wheel from the shaft or removing the chain from the wheel, keeping the wheel pitch diameter at the proper ratio to the chain pitch.

Another advantage in this modern adjustable wheel is that the teeth or pocket sections are made of harder material to better resist wear, and if necessary can be replaced as simply and quickly as making the adjustment.

The new wheel was developed and is now manufactured by the Newhall Chain Forge and Iron Company of New York.

Book Reviews

LLOYDS REGISTER OF AMERICAN YACHTS. 630 pages and 66 lithographed full-page plates of yacht flags, including 3153 private signals and 554 burgees of yacht clubs. Bound in blue cloth with gold stampings. Published by Lloyds Register, New York. Price $14.00.

This 29th Annual Edition shows a healthy growth of interest in yachting, listing 5303 yachts, 518 yacht clubs, and 45 yachting associations. During 1930 300 yachts were added to the list.

An interesting item is Annual No. 306, Sloop Annie, owned by Dr. Emmet Rixford of San Francisco. Just entering her 71st year, she is the oldest American yacht in commission. She was designed and built by Captain Bob Fish at Pamrapo, New Jersey, in 1861, and was brought to San Francisco on the deck of the famous sailing ship Three Brothers.

An Unusual Derrick Barge Feat

Smith-Rice No. 3 Spots 43 Tons, 130 Feet Above Water

THE photographs reproduced on this page illustrate a very unusual feat performed recently at Mare Island Navy Yard by the Smith Rice derrick barge in lifting two 43-ton box girders to a height of 133 feet above the water and spotting them accurately in place at that height. These girders are 10 feet wide, 13 feet deep, and 137 feet 6 inches long, and form the cross member of a traveling crane that tops the new shipbuilding ways at the navy yard.

This new ways is to be the building platform for the new United States cruiser San Francisco. It is located adjacent to and parallel with the existing large ways at the navy yard.

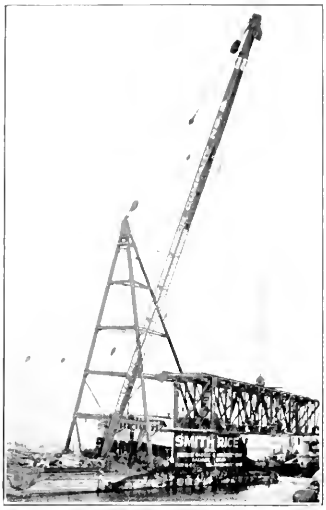
On one side of the new ways the tower of the new crane runs on the same track as the cranes serving the old ways. On the other side the tower track is supported by a new steel structure.

The Judson-Pacific Company contracted to fabricate and erect this new steel structure and the new crane, expecting to use the huge floating crane at Mare Island to hoist the members into place. It was soon apparent that the Mare Island crane was out of the picture because, with her deep draft, she could not get near enough to the work on account of some underwater piling in way of the slip.

Charles Rice of the Smith-Rice Company, Inc., San Francisco, was then called into consultation and a method of handling the whole contract was worked out, using the equipment of Smith-Rice, Inc. This method required that the boom of the Smith-Rice derrick barge be lengthened by 45 feet, making a steel lattice girder boom 145 feet long.

The steel legs for supporting the track truss, the track truss, the towers, and the cross girders of the crane were fabricated as units in the San Francisco plant of the Judson Pacific Company, trucked to the waterfront, barged to Mare Island, and erected there by the help of the derrick barge.

After erection of the new track truss, the towers, each weighing approximately 23 tons, were lifted and braced in position at the outboard end of tracks ready to receive the cross girders. The tops of these towers in position are 120 feet above the water. It will be readily realized that some delicate handling would be required to lift each 43-ton cross girder and spot it accurately ready to be riveted in place on the towers.



Upper illustration shows the Smith-Rice Derrick Barge No. 3 at the beginning of the lift. Lower illustration shows 43-ton girder ready to spot on top of crane towers.

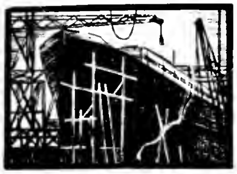
The barge was spotted and the boom set so that the girder when lifted to the right height would be as nearly as possible in line. The barge was held in position by four anchors and wire cables and two manila shore lines, each on a separate winch. On a favorable high tide the girder was lifted and the barge warped in carefully to spot the girder.

The operation went through on schedule, a tribute to the judgment of Charles Rice, under whose personal supervision the work was completed.

These girders were handled by a seven-part load fall of 1-inch Roebling 6 by 19, Blue Center steel wire rope manufactured by John A. Roebling's Sons Company of California. Blue Center wire rope is standard equipment in Smith-Rice derrick barge service.

THE UNITED STATES SHIPPING BOARD. By Darrell H. Smith and Paul V. Betters. 6x8 inches; 338 pages; cloth. Published by Brookings Institution, Washington, D.C. Price $2.50.

This is No. 63 of a series of service monograms of the United States Government.



American Shipbuilding

Edited by H. C. McKinnon

SIGNIFICANT TWIN LAUNCHING

Twin Launching. — On numerous occasions in the history of the Newport News Shipbuilding and Dry Dock Company there have been twin launchings, probably the outstanding event of that nature being the launching of the two battleships Kearsarge and Kentucky on March 24, 1898. If the war-ship-building program is excepted, probably the occasions when two sister ships of medium or large size have been launched practically simultaneously in any of the shipyards on either Atlantic or Pacific Coast of the United States are exceedingly few, particularly in the last decade.

That is one reason why the twin launching of the Talamanca and Segovia on August 15, 1931, at Newport News, deserves more than passing notice. Another reason is, of course, the fact that they had the honor of being sponsored by Mrs. Herbert Hoover, wife of the nation's Chief Executive, and christened with water collected from various rivers in Central America. Present at the launching was a distinguished gathering of diplomatic representatives from all the Central American countries to which the vessels will trade when they go into service.

The Talamanca and Segovia are the first of a fleet of six sister ships now under construction for the United Mail Steamship Company of Boston, a subsidiary of the United Fruit Co. Three of the vessels are being built by the Newport News Shipbuilding and Dry Dock Company, the third to be named Chiriqui and to be launched the latter part of this year.

The principal dimensions and particulars are as follows:

Length over-all	447'0"
Length on water line	430'0"
Length between perpendiculars	415'0"
Beam	60'0"
Depth to upper deck	34'0"
Load draft	24'6"
Displacement at load draft, tons	11,000
Gross tonnage (about)	7,200
Sea speed at normal draft, knots (about)	18

The vessels have four decks in the hull proper, a combined forecastle and bridge, a poop, and three tiers of steel deck houses above the bridge deck. They are twin screw, have one smoke stack, and are built to conform to the requirements of the International Convention for the Safety of Life at Sea (1929). All spaces available for cargo are insulated and are provided with refrigerated air for the carriage of fruits, particularly bananas.

In the separate compartment aft of the main engine room there is a complete refrigerating plant consisting of three sets of carbon dioxide compressors, etc., which provide the necessary brine circulation through the air coolers which are fitted in eleven of the fourteen fruit carrying compartments. Motor driven fans are fitted in conjunction with these air coolers to circulate said air through ducts carried all around each compartment. The refrigerating plant is capable of maintaining a temperature of 53 degrees Fahrenheit for fruit and of reducing the temperature of a full cargo of bananas to that temperature in approximately twenty-four hours under tropical conditions. There is also a separate ammonia type plant for use with a special cargo space which is provided at the after end of the main deck.

Provision is also made for carrying general cargo, especially large hatches being fitted in No. 2 hold to allow railroad iron and large pieces of machinery to be shipped.

Accommodations are provided for about 115 first-class passengers in 61 rooms, and two special suites containing a sitting room, stateroom, and private bath. The public rooms will be quite extensive for this type of vessel, including large entrance lobbies, a library, lounge, smoking room, dining room to seat entire passenger list, and a glass-enclosed deck ballroom. The design of all the public spaces and their appointments and furniture will be modern Spanish. There is a permanent outdoor swimming pool and large promenade space. Practically all the galley equipment will be electrically operated.

The propulsion machinery is turbo-electric, with the main turbo-generators and two propulsion motors, one for each of the two shafts. Steam will be furnished by four oil-burning Babcock & Wilcox water-tube boilers which operate under forced draft and are fitted with superheaters. The working pressure is 350 pounds and the superheaters will give about 250 degrees superheat. The machinery is capable of developing 10,500 brake horsepower. Main turbines, generators, and motors were supplied by the General Electric Company, which firm also supplied the auxiliary electric plant which consists of three 600-kilowatt geared turbine generating sets.

The vessels are being built under the special survey of the American Bureau of Shipping for their highest classification. They will embody all applicable requirements of the International Convention and those of the Shipping Board, whose loan fund has made their building possible. The other three vessels for the United Mail Steamship Company are under construction at Bethlehem Shipbuilding Corp., Quincy, Mass. Three of the six vessels are for operation on the San Francisco-Central America run and three are scheduled for the Atlantic Coast run.

To Repair Fireboats.—According to a report from Seattle, the City Council is figuring on extensive repairs to the fireboats Alki and Snoqualmie. Repairs to the Alki are said to be estimated at $60,000. She is a gasoline-engine powered 120-foot vessel, built in December 1927. The Snoqualmie is an old vessel and in need of general repairs. The work will be done in a Seattle yard.

Keels Laid for Panama - Mail Vessels. — Keels were laid on June 22 and August 4 for the first two of the four twin-screw express liners for the Panama Mail Steamship Company, San Francisco, under contract with the Federal Shipbuilding and Drydock Company, Kearney, New Jersey. The four vessels are for operation between San Francisco and Los Angeles to New York via the Panama Canal and central American ports. The construction has been possible through the award of a mail contract on the San Francisco-Central American route. The company is a subsidiary of W. R. Grace & Company.

The vessels will be 508 feet long, 72 feet beam, and will be propelled by two 6000-horsepower General Electric geared turbines, and auxiliaries will be electrified by General Electric equipment.

Each ship will have a loaded speed of 19 knots. At sea, the supply of auxiliary electricity will normally be from two 500-kilowatt generators attached to the reduction gears of the propulsion equipment, but this electricity may also be obtained from two 500-kilowatt turbine generator sets. The latter two sets will float on the electric system when the vessel is operating at the higher speeds, but, when the speed drops below 70 per cent. of maximum, the turbine generator sets will automatically take over the electric load of the auxiliaries. In port, electricity will be supplied from a 200-kilowatt turbine generator set.

School Ship Reconditioning Bids. —Bids were opened at the office of the Navy Department, Washington, D.C., on August 20 for reconditioning the school ship California State, now at Mare Island Navy Yard. The vessel, the former Henry County, a Lake-type vessel, has been transferred from the Shipping Board to the Navy Department, and will be reconditioned and turned over to the State of California for use as a training vessel for merchant marine cadets. The bids were as follows:

Bethlehem Shipbuilding Corp., Ltd., San Francisco, $219,000 and 120 days; General Engineering & Drydock Co., Oakland, $285,000; United Engineering Co., San Francisco, $254,922.

Contract was awarded to Bethlehem on the basis of low bid, with some changes to bring the cost under the appropriation of $200,000.

Large Repair Job — Todd Dry Docks, Inc., Seattle, has obtained a large repair job on the steamship Bellingham of the Tacoma Oriental Steamship Company. The Bellingham was damaged in collision with a Japanese steamer while in the Orient. Repairs will necessitate the removal of more than 30 plates for fairing and replacement and the building of a new stem.

Recondition Yacht for Pilot Service. — The San Francisco Bay Pilots are reported to have purchased the auxiliary yacht Zodiac for pilot service. The yacht will be brought to San Francisco from the Atlantic Coast and reconditioned for her new service. It is reported that work will include the installation of a new engine, changes in the cabins and crew quarters, deckhouses, rigging, and hull at an estimated cost of $50,000.

Welded Lighter Launched.—The U.S. Navy Yard, Mare Island, California, recently completed an all-welded garbage lighter, YC16, for service at San Pedro.

The YC16 has been built without the use of a single rivet. The fabrication of the parts of the vessel was carried out without the use of assembly bolts, so that no punched holes were necessary. Little six-year-old Katherine Richey, daughter of Commander T. B. Richey, of the production department, was the sponsor at the launching.

Two High Speed Launches. — The Crowley Launch & Towboat Company of San Francisco is contemplating the construction of two 50-ft., 150-horsepower launches for San Francisco Bay use. The launches will be used principally for conveying visitors to the battleships from Pier 14 to the fleet when it is anchored in Battleship Row. They will each accommodate 100 passengers. The launches will be powered with Hall-Scott gasoline engines and will probably be built by Nunes Brothers, Sausalito.

Police Boat Building.—Anderson & Cristofani, well known boat building firm of San Francisco, is working on the construction of a 66-ft., twin screw, police boat for the San Francisco Police Department. The work is progressing satisfactorily, and the boat will be delivered in September. She has a beam of 13ft. 9in. and is 6ft. 7in. deep. She is of the cruiser type with deck structure containing the pilot house forward and a main saloon amidships. A galley equipped with Flamo natural gas is located forward of the saloon. Below deck are located two staterooms in the after cabin with adjoining bath. Officers' quarters are forward of the engine room space. The vessel is to be equipped with hot and cold running water and electric auxiliaries.

The launch will be powered by two 175-horsepower Hall-Scott gasoline engines operating on two screws.

This yard is also building, at the present time, a 32ft. hunting barge for Herbert Hogrefe, former owner of the Funrunner. General repairs to workboats, fishing boats, and pleasure craft keep this yard busy and ready for any type of wooden boat building.

Contract Awarded on Mail Subvention. — Contract was awarded August 20 by the Post Office Department, W. Irving Glover, Assistant Postmaster-General, Washington, D.C., for the carriage of United States mail between Seattle and Tampico, Mexico, Puerto Colombia, Colombia, via Kingston, Jamaica, on a schedule of not less than 12 nor more than 24 trips a year.

The Gulf Pacific Mail Line, Ltd., of San Francisco, was low bidder on a basis of $2.00 for Class 6 vessels and $3.50 for Class 5. Luckenbach Steamship Company of New York bid $2.25 for carriage in Class 6 and $3.75 for Class 5.

The contractor for this route will be required to construct two vessels capable of maintaining a speed of 13 knots an hour. These vessels must be placed in service as Class 5 vessels within one year from the beginning of the contract. One new vessel of Class 5, capable of maintaining 13 knots and of a gross tonnage of 3200 tons, must be constructed and placed in service within three years of the beginning of the contract.

Bids were opened in the offices of the Postmaster General W. Irving Glover August 17 and contract awarded August 20 for carriage of mails on the route from New York to Rotterdam from Baltimore by Newport News and Norfolk to Rotterdam, and from New York to Antwerp, and from Baltimore by Newport News and Norfolk to Antwerp, or from Boston or Philadelphia to Rotterdam or Antwerp. The schedule provides for not less than 72 nor more than 108 trips a year. The American Diamond Lines, Inc., New York, submitted the only bid on this contract, it being $2.50 per mile for Class 6 vessels, $4 per mile for Class 5, $6 for Class 4, $8 for Class 3, and $12 for Class 1. This is the maximum under the Merchant Marine Act of 1928.

The other route for which contract was awarded covers a run from Mobile or other East Gulf ports to Havre, Liverpool, Manchester, Glasgow, and Belfast. The Waterman Steamship Corp., Mobile, made the only bid on this second route, the maximum bid allowed under the Merchant Marine Act being the one submitted.

Sale Contract Approved. — Approval of the terms and conditions of the sales contract covering sale of the American Diamond Lines to the Black Diamond Steamship Corporation of New York was granted by the Shipping Board July 28. The sale, which was agreed to under a resolution dated June 3, 1931, is to be made in consideration of $1,660,181.25 under terms to guarantee performance of conditions set forth in a proposed ocean mail contract covering the route served by this line.

The price is predicated upon performance by the purchaser of certain improvements to the line which will consist in the **construction of five sixteen-knot steamers** during a ten-year period, and the **reconstruction of five** of the present steamers to give them speeds of thirteen knots. In the event these improvements are not effected, the sales price will be at the rate of $28.65 a ton instead of $16.25 a ton.

The line consists of twelve typical 10-knot cargo vessels, having an aggregate tonnage of 102,165 deadweight.

Steamship Sold. — Sale of the steamship Eastern Sword to Captain C. Poulacos, on behalf of the Colonel Steamship Corporation, of New York, for the sum of $54,000 was approved by the Shipping Board August 11, with the understanding that the vessel be converted to a bulk cargo carrier at a cost of not less than $35,000. Payment for the vessel will be on the basis of $30,000 cash, with the balance payable in three equal annual installments. The ship is to be used between North Atlantic and Gulf of Mexico ports of the United States. The Eastern Sword is a steel cargo steamer of 5532 deadweight tons. She is laid up at Staten Island, having been inactive since June, 1924.

Mail Route Certified. — Certification of the type, size, and speed of vessels required for the maintenance of a line for the transportation of railway freight cars between New Orleans and Havana was forwarded to the Postmaster-General by the Shipping Board August 11. Frequency of service during the first two years of the proposed ocean mail contract will be 50 a year, and thereafter 100 a year. At the outset, vessels of 6500 deadweight tons capable of 13 knots sea speed and having capacity for 90 freight cars will be acceptable, but at the close of the first two year period the contractor will be required to add two new vessels of the same size and capacity, but capable of 14 knot speed.

Big Repair Contract. — The Burrard Drydock Company, North Vancouver, British Columbia, was awarded the contract for repairing the Canadian National passenger vessel Prince David, which went ashore near Point Wilson July 31 and was extensively damaged. Bids were submitted for the work, the Burrard yard bidding low at $98,770. Repairs will consist of removing and replacing forty plates and other damaged parts, and will require 46 days' time.

Battleship Machinery Contract Awarded. — Westinghouse Electric and Manufacturing Co. has been awarded contract for the propulsion machinery to replace the electric type propulsion machinery now installed in the battleships New Mexico. Order was also placed for machinery for the battleships Mississippi and Idaho. The vessels are to be reconditioned by the Navy at an approximate cost of $10,000,000 each. While the amount of the Westinghouse contract has not been made public, it is doubtless the largest single contract awarded for marine machinery in at least a decade.

The present propulsion machinery installation in the warships will be replaced by geared turbines which will be designed along the most modern lines and will take full advantage of the latest usage of high pressures and superheats.

Recondition Freighter. — The old rum-runner Quadra, which has been tied up in San Francisco Bay since 1924, has been sold to the Pacific and Orient Company of Los Angeles Harbor and has been towed to Long Beach. It is reported that the vessel will be reconditioned for service between Los Angeles Harbor and Mexican ports. The vessel is to be re-engined, diesels to be employed. She will also be equipped with a limited amount of refrigerator space.

Bids Submitted for United States Lines. — Paul W. Chapman, president of the United States Lines, has submitted to the Shipping Board a special offer under which the United States Lines may be operated under the present ownership with the financial assistance and backing of R. Stanley Dollar, San Francisco and Kenneth D. Dawson, of Portland, Oregon. Under this proposition, sailings of the Leviathan would be reduced to seven round voyages a year instead of the present requirement of seventeen, and a guarantee of complete construction of two vessels now being built for the North Atlantic trade by the New York Shipbuilding Company. In addition, the line would continue to operate the President Harding and President Roosevelt between New York and Hamburg on the present schedule. The America and the George Washington would probably be tied up, and negotiations are now under way to transfer the steamship Republic to the United States Army transport service.

Under original bids for the sale of the United States Lines opened August 13, the Roosevelt-International Mercantile Marine Company bid $12,000,000 to be paid in notes. For the purpose of operating the line, a new company would be formed.

Under Chapman's original proposal, as submitted to the Shipping Board August 13, it was proposed to turn back to the Shipping Board the steamers Leviathan, George Washington, and America, for which a credit of $8,086,500 would be received, representing the original purchase price of $10,782,000 less 25 per cent. Under such agreement, the United States Lines would continue to operate the Leviathan on a percentage basis.

The terms of the proposal of the Chapman-Dollar-Dawson interests were made known to the Roosevelt-I.M.M. Lines, and the settlement of the affairs of the United States Lines were to be discussed further at Shipping Board meetings.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of August 1, 1931

Pacific Coast

BERG SHIPBUILDING CO.,
28th Ave., N.W., Seattle, Wn.

Survey vessel for Hawaii for the U. S. Army Engineers Office, San Francisco; 65 x 16; 40 tons displ.; Atlas-Imperial diesel.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Polson Bldg., Seattle, Wn., for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1200 B.H.P. McIntosh & Seymour diesel eng.; 14 knots speed.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Purchasing Agent: F. W. Philpot.

Velero III, hull 153, twin-screw, all-steel cruiser for G. Allan Hancock, Los Angeles; 193' L.O.A.; 190' L.W.L.; 30' beam; 11'9" mean draft; two 6-cyl., 850-S.H.P. Winton diesel engs.; 15¾ knots speed; 9500 mi. cruising radius; keel June 16/30, launched 4/2/31; **delivered 7/15/31.**

Samona II, hull 154, twin-screw, steel yacht for W. J. Hole of Los Angeles; L. E. Geary, Seattle, designer; 146 ft. long; 23.5 beam; 10.5 draft; two 500 H.P. Winton diesel engs.; keel 3/15/31; launched 6/25/31; left plant on maiden trip 7/31/31.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

W. M. Wightman, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; launched 6/18/31; deliver 7/1/31 est.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; **launched 7/27/31;** deliver 9/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; launch 8/20/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement.

Repairs, Pacific Coast

BETHLEHEM SHIPBUILDING CORP., Ltd., Union Plant

Drydock, clean, paint, misc. repairs: stmrs. Tascalusa, City of Los Angeles, Eureka, Shabonee, Malolo, Horace Luckenbach, President Hayes, m.s. Kern, Redline, Herbjorn, Brunswick, State Dredge No. 3, Pacific Coast Dredging Co. No. 3, tug Gov. Irwin, tug F.A. Douty, tug Sea Witch, launches Olympic, Columbus. 4 sets metallic packing: stmr. Argyll. Pipe repairs: Tahama. Boiler repairs: stmr. Tejon. One tailshaft, one cast iron hub, one manganese bronze blade: stmr. Deroche. Misc. repairs: stmr. Point Chico, San Mateo, Point Palmas, San Jose, Makura, Suriname, Watsonville, Tejon, Tamaba, Melville Dollar, Deroche, Pacific Redwood, m.s. Silveray, Zaragoza, launches Costa Rica No. 1, Akebona III, Standard, Daiho II, Standard II, Cleopatra, Success, New Monterey No. 2, Ubuyu Maru, Greenland, whaler Clemente.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydock, clean, paint: W. P. Barge No. 2 (also renewed fenders and bulwark stanchions), tug Payson (misc. deck and engine repairs), R. M. Woodward (also renewed shell plating, misc. engine repairs), stmr. Mahko (also welded in way of stern frame and boss plates, overhaul sea valves, repacked stern gland, removed propeller blades, faired and reset pitch), stmr. Alaskan (repaired anchor chains, repacked stern gland, caulked misc. rivets and seam, other engine and deck repairs), stmr. Golden Tide (renewed shoe on bottom of transverse frame in afterpeak tank, fitted angles in oxter shoe, renewed rivets in afterpeak tank top, caulked and welded other misc. rivets), Crowley barge No. 3 (also caulked seams and butts), stmr. Frances (also misc. engine and hull work), tug A. G. Wells (also caulked and welded misc. rivets and seam, overhaul sea valves, lined up tail shaft, renewed sea strainers), stmr. Mexican (also caulked and welded rivets in forepeak tank, installed patch on deck and other misc. engine and deck repairs), stmr. Sutherland (overhauled sea valves, repacked stern gland, overhaul generator engine and circulating pump, renewed hatch battens, misc. repairs), stmr. Jacox (also ranged anchor chains, repair forepeak and No. 1 tank D.B., repairs to rudder, overhaul sea valves, other misc. repairs), Bay Cities Barge No. 6, (also caulked misc. seams and butts), stmr. Pennsylvanian (also repacked stern gland, renewed fair water plates on rudder, ranged anchor chains and repaired same, caulked misc. rivets and seam), ferry Golden West (changed propeller, misc. repairs), stmr. Dakotan (caulked misc. rivets and seam, faired tip of one propeller blade), stmr. Golden Wall (removed wheel, drew tail shaft, repacked stern gland, caulked misc. rivets and seam), stmr. Elizabeth (renewed seating under boiler, repaired boiler, other misc. engine and deck repairs), Voco (drydock, clean, paint, general overhaul), Kansan (also caulked rivets and seam and other misc. repairs), stmr. Oregonian (misc. repairs), Willzipo (misc. repairs). Drydock and damage repairs: W. P. Barge No. 1. Drydock and resecured propeller: stmr. Lake Frances.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle

Engine repairs: m.s. Canada. Drydocking, cleaning, painting, misc.: stmr. Charcas, stmr. Everett. Voyage repairs, etc.: stmr. Lena, President Cleveland. Misc. repairs: stmr. Lena Luckenbach, stmr. San Bernardino, stmr. San Clemente, stmr. San Lucas, stmr. Yorkmar.

UNITED STATES NAVY YARD,
Bremerton, Wn.

Drydock and misc. repairs: Maryland, California, Texas, Louisville, Aaron Ward, Rathburne. Misc. repairs incidental to operation of district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo. Fitted out as School Ship for State of New York: Procyon.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **10 keels laid; 7 launched; 6 delivered.**

BATH IRON WORKS
Bath, Maine

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31; deliver 11/1/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft length; 3000 H.P. diesel eng.; keel 9/1/30; **launched 7/18/31;** deliver 8/15/31 est.

Felicia, hull 145, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/30/31; **launched 8/1/31;** deliver 8/16/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 5/1/31; deliver 11/29/31 est.

Hull 148, same as above; keel 5/6/31; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31; deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; **keel 7/22/31;** deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; $20\frac{1}{2}$ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31.

Monterey, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; $17\frac{1}{2}$ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launch 10/25/31 est.

Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4286, steel barge for Bush Terminal Co., 792 gr. tons; launched 5/5/31.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S.C.

One all-welded steel yacht, owner not named; 50 x 13 ft.; diesel eng.; keel 11/30; deliver at Savannah 6/15/31 est.

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam; keel 8/31 est.

Repairs: Drawing tail shaft for examination: yacht Venetia.

DEFOE BOAT & MOTOR WORKS,
Bay City, Mich.

Purchasing Agent: W. E. Whitehouse.

Lenore, hull 148, wood yacht, for S. L. Avery, Chicago; 91'6" L.B.P.; 15'9" beam; 4'6" loaded draft; 85 D.W.T.; 24 mi. per hour speed; 1000 I.H.P. diesel eng.; keel 4/1/31; **launched 7/10/31; delivered 7/18/31.**

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **26 delivered.**

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x 11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia; **delivered.**

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.; launched 7/2/31.

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.

The modern American traveler demands the same conveniences afloat as he enjoys ashore. Here is one of the completely tiled bathrooms in first class passenger accommodations on the S.S. President Hoover.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31.

Not named, hull 122, sister to above; **keel 8/4/31.**

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

GREAT LAKES ENGINEERING WORKS,
River Rouge, Michigan

Hull 276, self-propelled canal barge for Ford Motor Co.; 290 x 43 x 10 ft.; 12 knots loaded speed; 2000 D.W.T.; twin screw, geared turbined 1600 I.H.P.; 2 watertube boilers; keel 3/15/31; launched 5/9/31; **delivered 7/30/31.**

Hull 277, sister to above, keel 3/25/31; launch 5/16/31; **delivered 7/30/31.**

R. H. Goode, hull 278, tug for Dunbar & Sullivan Dredging Co.; 90 L.B.P.; 24'6" beam; 13 loaded draft; 12 loaded speed; comp. steam eng. 750 I.H.P.; 1 14-ft. Scotch boiler; keel 5/23/31; launched 6/26/31; **delivered 7/23/31.**

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Huckleberry Finn, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launch 7/15/31 est.; deliver 12/21/31 est.

One steel maneuver boat hull for U. S. Engineers Office, Cincinnati; complete with derrick; 75 x 24 x 4'6"; keel 6/25/31; launch 7/23/31 est.; deliver 8/15/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.

MIDLAND BARGE COMPANY,
Midland, Pa.

Five barges for Inland Waterways, Corp., Washington, D.C.; 230 x 45 x 11 ft.; 4 keels laid; launched.

Three barges for U.S.A. Engineers, Mobile, Ala.; 100 x 24 x 7 ft.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; launched 3/5/31.

Hull 249, same as above; keel 1/17/31; launched 3/16/31.

Hull 250, dredge for Sternberg Dredging Co.; 150x50x7'10" depth; keel 3/12/31; launched 6/3/31.

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 6/22/31 est.; launch 7/25/31 est.

Hull 256, oil barge for stock; 140 L.B.P.; 26 beam; 8 depth; keel 6/4/31; launch 7/10/31 est.

Hull 257, same as above; keel 6/10/31; launch 7/20/31 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

President Hoover, hull 339, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speeed; keel 3/25/30; launched 12/9/30; **delivered 7/11/31.**

President Coolidge, hull 340, sister to above; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; $17\frac{1}{2}$ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launch 8/15/31 est. deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launch 8/15/31 est.; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 12/31 est.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; **keel 7/21/31;** deliver 5/32 est.

Not named, hull 351, sister to above; keel 9/31 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Excambion, hull 397, passenger and cargo steamers for Export Steamship Corp., New York; 450x61'6"x42'3"; keel 10/25/30; launched 5/28/31; **delivered 8/4/31.**

Indianapolis, hull 399, light cruiser No. **35** for United States Navy; **10,000 tons** displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers; keel 10/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.
Purchasing Agent: James Bradford.

Richmond, hull 1051, steel harbor tugboat for The Chesapeake Ohio Railway Co.; 102'6" L.B.P.; 28 beam; 10'6" loaded draft; 1000 I.H.P. steam engs.; 1 Scotch boiler, 16x12 ft.; 160 lbs. wk. press; keel 2/12/31; launched 5/5/31; deliver 7/25/31; **completed 7/29/31.**

Jersey Shore, hull 1053, steel hull and steel superstructure for auto carrying ferryboat for Delaware-New Jersey Ferry Co.; 174'7" L.B.P.; 58 beam; 9'3" loaded draft, diesel machinery and other work by owners; keel 5/26/31; **launched 7/30/31.**

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland
Purchasing Agent: W. J. Collison.

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31 est.; launch 12/1/31 est.; deliver 7/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.
Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; launch 10/1/31 est.; deliver 11/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 9/15/31 est., deliver 10/1/31 est.

Hulls 141-145 incl., five small barges for Sun Oil Co.; 70 x 19 ft.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Murray Hill, hull 50, stem ferry for Department of Plant & Structure, City of New York; 151 L.B.P.; 53 beam over guards; 8'4½" loaded draft; double comp. steam engs.; 660 I.H.P.; 2 W.T. boilers; keel Jan/31, launched 5/27/31; **delivered 6/13/31.**

Washington Square, hull 51, sister to above; keel Jan/31; launched 5/27/31; **delivered 6/13/31.**

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; **keel 6/23/31.**

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.
Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launch 10/1/31 est.; deliver 2/1/32 est.

Knickerbocker, hull 798, ferryboat for New York Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft, 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launch 9/1/31 est.; deliver 10/1/31 est.

A. G & P. Co. No. 11, sister to above; keel 5/7/31; **launched and delivered 7/8/31.**

Hull 802, float, truss weld. for Jas. Stewart & Co., Inc.; 100 L.O.A. x 31 feet, **keel 8/4/31;** launch 8/28/31 est.; deliver 8/31/31 est.

Trade Literature

FlexArc A-C Welder, manufactured by Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., is described in a leaflet No. L. 20522 recently published. This is a portable unit, on wheels, with short wave arc control.

Harbor Map has recently been published by the Board of Port Commissions of the Port of Oakland, Calif., and is available for distribution. The map shows the entire port area and all of the new municipal facilities, as well as additions to private terminals which have been constructed since the last map was published.

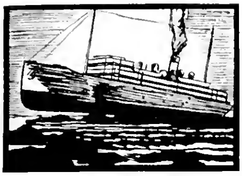
Portland, Oregon, Commission of Public Docks has ready for distribution the Report for the Year ending November 30, 1930. This is more than a compilation of statistics. The port book contains complete data and some fine illustrations showing the extensive port facilities and some views of the City of Portland and the contributing territories. A number of line-drawings of the various pier layouts and a line drawing of the port area are inserted.

New Port Studies of Los Angeles and Long Beach—Part 1 of Port Series No. 13— has been issued by the Board of Engineers for Rivers and Harbors, War Department, Washington, D. C. This publication contains much information of value to American importers, exporters, manufacturers, steamship lines, railroads, port authorities, and commercial organizations interested in the movement of goods through American ports. The report shows in detail the facilities for handling traffic, gives information regarding port and harbor conditions, and their charges and practices in connection with terminal service.

Port Series Report No. 13, Part 2 (Revised 1930) is a publication by the Board of Engineers for Rivers and Harbors, War Department, Washington, D. C., on the Ports of San Diego and San Luis Obispo, California, in cooperation with the United States Shipping Board. Contains the same type of information for these two ports as is contained in Part 1 with reference to the Ports of Los Angeles and Long Beach.

Todd Service is the title of a little leaflet recently issued by Todd Shipyards Corporation to set forth its facilities on the Atlantic, Gulf and Pacific. Todd facilities for ship building and ship and engine repairs include 2 graving docks, 24 floating docks, 3 shipbuilding ways, 25 piers, 90 shops, 8 power plants, and 10 service vessels. It operates the largest dry-dock in New York harbor, and the leaflet contains a description of the various plants and a table of sizes of the various docks.

This serviceable type of cruiser, fitted for fishing, is becoming very popular on Gulf, Atlantic, and Pacific Coasts. The Marline is 51'6" by 12'6" by 2'10". She was designed by Eldredge & McInnis, Inc., and built by Fred D. Laeley, Inc. Her two Sterling Dolphin 6-cylinder engines give her a speed of 28 miles an hour.



Marine Insurance

Edited by James A. Quinby

English Law and Usage

The Meaning and Scope of a Provision Frequently Found in Marine Policies

IN many marine policies now in common use on the Pacific Coast there is a clause providing that, for certain purposes, the contract is to be construed in accordance with English law. For example, in the American Hulls (Pacific) 1923 form, issued by the Board of Marine Underwriters of San Francisco and ordinarily used as a rider on hull policies, we find the following provision:

"Notwithstanding the foregoing this policy is . . . (d) Warranted to be subject to English law and usage as to liability for and settlement of any and all claims."

In the absence of such a clause, the policy, under the general rule of law as to contracts, is governed by the law of the place where it is made or to be performed. The reference to English law is inserted in order that the underwriter may escape the effect of certain arbitrary decisions and code sections dealing with constructive total losses under American law.

Constructive Total Loss

In California, for instance, it is provided by the Civil Code (Sec. 2717):—

"A person insured by a contract of marine insurance may abandon the thing insured, or any particular portion thereof separately valued by the policy, or otherwise separately insured, and recover for a total loss thereof, when the cause of the loss is a peril insured against;

1. If more than half thereof in value is actually lost, or would have to be expended to recover it from the peril."

In the present era of high valuations on vessels, it can readily be seen that an underwriter would scarcely relish paying the face value of his policy in return for a wreck that was but half depreciated.

The English law on this point is expressed by the Marine Insurance Act of 1906, Sec. 60 of which reads in part as follows:

"(1) Subject to any express provision in the policy, there is a constructive total loss where the subject matter insured is reasonably abandoned on account of its actual total loss appearing to be unavoidable, or because it could not be preserved from actual total loss without an expenditure which would exceed its value when the expenditure had been incurred."

The rule thus stated is just and clear in its intent. In words of one syllable, it provides that an assured cannot collect the face value of his policy unless the damage arising from the accident will, in effect, deprive him of the vessel's value. The American rule, on the other hand, is rooted in the assumption that, in any major disaster, an assured should be allowed to collect the full amount of his policy and let the underwriter worry about the salvage. The American rule has existed in this country for over a century and there appears to be no immediate hope of changing it. The majority of underwriters have accordingly included the English law provision in their policies, or have used a specific requirement that the cost of salvage and repairs must exceed the insured value in order to justify an abandonment.

A broad provision for English law, however, such as the one quoted above from the A.H.P. form, entails other English rules in addition to the one in respect to constructive total loss. It clearly includes a reference to the English doctrine as regards the warranty of seaworthiness.

The Warranty of Seaworthiness

Under American law there is an implied warranty in all marine policies, not only that the vessel is seaworthy at the commencement of the venture but that she will be kept so upon all successive voyages or stages of the adventure. The California Civil Code (Sec. 2681) provides:

"In every marine insurance upon a ship or freight, or freightage, or upon anything which is the subject of marine insurance, a warranty is implied that the ship is seaworthy."

And (Sec. 2683),

"An implied warranty of seaworthiness is complied with if the ship be seaworthy at the time of the commencement of the risk, except in the following cases:

One.—When the insurance is made for a specified length of time, the implied warranty is not complied with, unless the ship be seaworthy at the commencement of every voyage she may undertake during that time."

Phantom Gold

Between the Gate and the Farallons,
  Where the whistling buoy sighs,
Fathoms deep on the channel stones
Guarding her treasure of mouldering bones
  The City of Rio lies.

Other graves in scores untold
  May rest in the sombre deep;
But never so long as tales are told
By ancient men with a lust for gold
  Will the City of Rio sleep.

Her empty strong-room can never assuage
  Their ghoulish thirst for gain.
It matters not. The printed page
Repeats the dream of the doddering sage,
  —The Rio's found again.

—J. A. Q.

Thus the implied warranty, under the law in the United States, imposes an onerous burden on the assured. Even in cargo policies, the cargo owner, in the absence of specific agreement in his policy, cannot recover for a loss due to unseaworthiness of the carrying vessel. Most modern cargo policies, however, provide that as between the assured and the insurer, the seaworthiness of the vessel is admitted.

As regards a time policy, the English law is comparatively favorable to the assured. The Marine Insurance Act of 1906, (Sec. 39-(5)) reads as follows:

"In a time policy there is no implied warranty that the ship shall be seaworthy at any stage of the adventure, but where, with the privity of the assured, the ship is sent to sea in an unseaworthy state, the insurer is not liable for any loss attributable to unseaworthiness."

To sum up, a provision for English law and usage in a hull policy gives the underwriter certain advantages in the field of constructive total loss and subjects him to corresponding disadvantages in the matter of the implied warranty of seaworthiness. From an equitable viewpoint, we believe the English law on these two points is more fair and sensible than the American law. It now remains only for some scheming underwriter to issue a policy expressly providing for English law as to constructive total loss and American law as to seaworthiness

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Watchman Warranty Upheld

A HULL policy containing a warranty that under certain conditions the vessel shall be in charge of a watchman has recently been the subject of litigation in The Minnie R., 1931 A.M.C. 995, (reversing 1930 A.M.C. 68).

The District Court for the Southern District of Texas originally allowed the assured to recover a fire loss under the policy in spite of the fact that the watchman was absent from the boat from nine to sixteen hours with the consent of the assured, during which time the fire occurred. At the time the loss took place the vessel was laid up and out of commission. The policy bore the following clause:

"Warranted by the assured that the said vessel shall at all times during the continuance of this policy . . . . . shall at all times have a competent watchman on board, except that when the vessel is laid up and out of commission she shall be in charge of a competent watchman."

The District Court's decision was based upon the two types of warranty involved in this clause and held that, as the watchman did not have to be actually on board all the time when the vessel was laid up, the owner could recover, as the facts showed that the watchman could reasonably be said to be "in charge."

In reversing the lower court, and holding that there had been a breach of the warranty, the Circuit Court of Appeals commented as follows:

"It is evident that in this case the policy and the two riders must be construed together to form one contract. The policy issued before the vessel was laid up but, as a time policy, it was intended to cover the vessel whether laid up or in commission. The watchman warranty was very material to the risk. In fact, the presence of a watchman would be more likely to prevent loss by fire when the vessel was laid up than loss from perils of the waters or fire when the vessel was in commission and manned by a full crew. It is inconceivable that an insurer would enter into a contract waiving this essential provision. Certainly that conclusion could not be reached unless clearly shown by endorsement on the policy in some way. The riders do not expressly waive this warranty and there is nothing in them inconsistent therewith. It may be said that this was the practical construction given the policy by appellee by employing a watchman.

. . . .

This requires the consideration of whether the warranty was breached in this case. Under the warranty the insured was obliged to employ a competent watchman and to keep him in charge of the vessel at all times within the life of the policy. It was not necessary that the watchman should be actually on board the vessel. However, within the meaning of the policy, the term "watchman" clearly implies one who is in a position to see and that he should be in close proximity to the vessel in his charge at all times in order, if possible, to prevent her destruction by the peril insured against. It may be conceded, for the purpose of argument, that if a watchman was employed and was habitually in the immediate vicinity of the vessel, an absence for a short period for a good reason would not necessarily constitute a breach of the warranty, but this conclusion would depend upon the facts of the particular case. It would not be a compliance with the warranty to employ a watchman and then immediately withdraw him, thereby leaving the property unguarded, nor to permit him to so locate himself that the property would not be under his observation at all. Absence for from 9 to 16 hours with permission of the insured amounts to a withdrawal of the watchman. It would have been easy for appellee to have arranged to send the watchman his necessary supplies and clothing or to have provided a substitute during his absence. In this case it is reasonable to presume that had the watchman been at his post he would have discovered the fire in time to extinguish it with the means at hand before any considerable damage had occurred. We conclude that the warranty was breached in this instance and that the breach materially contributed to the loss."

Deviation to Land Engineers

WE have heard of deviating for fuel, for repairs, and for medical assistance, but in Mango & Co. et al., vs. The Stag Line (XXXVI Commercial Cases 213) The British Court of Appeal has recently decided for the first time that a vessel is not justified in deviating from her course to land engineers who were temporarily on board to check up on the performance of machinery.

The steamer Ixia was chartered to carry a cargo of coal from Swansea to Constantinople. The vessel was fitted with a superheater which had given some trouble on a previous voyage, and certain alterations were made to it while she was loading at Swansea. When she left Swansea, the owner's superintendent-engineer and an engineer representing the makers of the superheater were on board. It was their intention to return with the pilot after testing the superheater.

When the pilot was dropped, however, the engineers had not finished their tests, so the steamer later altered her course for St. Ives, which was off her regular course to Constantinople, and landed them there. Shortly afterward, as she proceeded along the Cornish coast to resume her voyage, she stranded and was lost with her cargo. The cargo owners sued the vessel owners, and were allowed to recover on the ground that the deviation was unjustified. We quote an interesting excerpt from the opinion:

"If what was done was not part of the contract voyage the next question is, Was what happened a justifiable deviation? Article IV., rule 4, of the Schedule to the Act of 1924 is as follows: 'Any deviation in saving or attempting to save life or property at sea, or any reasonable deviation, shall not be deemed to be an infringement or breach of these rules or of the contract of carriage, and the carrier shall not be liable for any loss or damage resulting therefrom'. This certainly alters the previous law in one respect. Previously deviation to save life was allowed, but not deviation to save property, unless, as has not been unusual lately, there was a clause in the bill of lading allowing it. A deviation to save property and earn salvage in which the cargo owner would not share might cause greatly increased risk and delay, with no benefit to the cargo owner. The rule, however, now allows a deviation to save property. The rule proceeds to allow 'any reasonable deviation'. It gives no indication whose interests are to be considered. For instance, where the master finds a stowaway on board, it may be 'reasonable' if only the interest of the ship is concerned to get rid of him by a deviation to some port, even if some distance away. The delay may be detrimental to the cargo owner. I think the interests to be considered must be those of the parties to the adventure in the contract adventure, which may include consideration of the position of their underwriters."

Changes in Coast Insurance Firms

THE Home Insurance Company of New York announces that Clayton E. Roberts has succeeded C. W. Jones as Pacific Coast Marine Manager, with headquarters in San Francisco. Mr. Jones, after a vigorous and successful term of office, has resigned to accept the position of resident vice-president of Newhouse and Sayre and has opened the Pacific Coast offices of that firm in the Pacific National Bank Building in San Francisco. Newhouse & Sayre represent the Home in the all-risk field, and also represent the Halifax Fire for all inland marine business in the United States.

Mr. Roberts, the Home's new marine manager, is no stranger to San Francisco, having been with the Commercial Union before the fire of 1906. From 1907 to 1923 he acted as underwriter and chief of the marine loss department for Louis Rosenthal. As a result of the experience and reputation gained under such able tutelage, Mr. Roberts was selected by the Home in 1923 to establish a marine department for that company in New Orleans. His effective work in the southern city resulted in his recent appointment to his present position.

Rathbone, King & Seeley, Inc., San Francisco, general agents, have opened a branch office in Los Angeles in charge of Ray Rosendahl, previously a member of the firm's San Francisco staff.

Rathbone, King & Seeley are general agents on the Pacific Coast for the following important companies: The Federal Insurance Company, Marine Insurance Company, Ltd., Century, U. S. Guarantee, Columbia Fire Underwriters Agency of National Fire, Pacific Coast Fire, and American Reinsurance.

World's Largest Fire Sprinkler Protects New Orleans' Docks

THE largest automatic fire sprinkler installation in the world was recently completed in New Orleans when the last of 118,000 quartz bulb sprinkler heads was installed for protection of the city's $9\frac{1}{2}$ miles of waterfront property. Providing protection for 27 dock units which annually accommodate more than one billion dollars in merchandise, this installation represents one of the most progressive steps ever taken by a port city in the interests of its shipping trade. Over $1,500,000 has been invested by the state of Louisiana in this gigantic fire protection system which ends the hazard of waterfront fires in one of the largest port cities of the United States, and substantially reduces the marine insurance rates for the port.

During the past two decades the waterfront fire losses in New Orleans totalled exactly half the waterfront fire loss for the entire country. These losses of approximately $1,000,000 a year have seriously interfered with marine service and docking facilities. With this history in mind, the port authorities decided on a thorough job of fire protection and called in the Grinnell Company of Providence, Rhode Island, who designed, manufactured, and installed the equipment.

Complete protection is provided regardless of the source of the conflagration. Not only all storage buildings, but also all dock structures have been equipped with highly sensitive quartz bulb heads, which function with twice the speed of the ordinary solder head. Since the quartz is not affected by salt air, immunity from corrosion assures instantaneous action at all times. In addition to these 118,000 quartz bulb sprinklers, some 2000 open or deluge sprinklers have been installed. To furnish adequate water supply 1,500,000 feet of pipe, varying in size from $\frac{3}{4}$ inch to 8 inches, have been used.

An unusual feature of the New Orleans sprinkler system is that it provides for putting out fires originating under the piers. This extra protection was deemed advisable because of the nature of the city's wharf construction. Several miles of frame buildings, with wooden roofs, plank flooring, creosoted wood piling, and wooden cross supports called for special protective measures.

Included in the installation are 250 separate systems of "wet pipe" sprinklers, with 250 alarm valves, and 34 "deluge systems."

Freights, Charters, Sales

THE following steamers have been fixed with grain to U.K. Cont.; British steamer Bradfyne, Portland or Puget Sound to U.K. Cont., 31/-, option Vancouver, B.C., 20/3, August, Heatley & Co.

The following steamers have been fixed with grain to the Orient: British steamers Dalryan and Innesmoor, Columbia River to Shanghai, $3, October, Bunge Grain Co.; British steamer Jedmoor, British Columbia to Shanghai, October, Bunge Grain Co.; British steamer Titanian, Columbia River to Shanghai, $3.10, October, Bunge Grain Co.; British steamer Vinemoor, Columbia River to Shanghai, September, Heatley & Co.; Danish motorship Siam, Vancouver, B.C., to China, $3.25 (relet), L. Dreyfus & Co.

The following time charters have been reported: Swedish motorship Pajala, 80 cents delivery Gulf, 90 cents delivery Colon, redelivery U.K./Cont. via North Pacific, August, Canadian Shipping Co.; British steamer King City, North Pacific to U.K./Cont., time charter or lump sum, August, Tatham Brommage Co.; Norwegian motorships Siljestad and Tyr, British Columbia to U.K./Cont. 1 trip, August; Norwegian motorship Nordvard, delivery North Pacific, redelivery Japan and China, one trip, August; Norwegian motorship Tyr, one to three months, delivery Newfoundland, redelivery U.K./Cont., via North Pacific, $1.05, September, Canadian Transport Co.

The Japanese steamer Yaye Maru has been fixed with lumber from North Pacific to Yokohama, Nagasaki Range, $6.25, August, by Allen Shipping Co.

PAGE BROS., Brokers

AMERICA'S LARGEST DIESEL YACHT

is

BATH BUILT

CAROLINE, 279-foot Clipper Yacht—the largest built by an American yard this year.

Bath Iron Works Corporation

BATH, MAINE.

SHIPBUILDERS and ENGINEERS

Yacht Building A Specialty.

Equipped to Build All Types of Vessels up to 500 feet.

They Both Chose Cooper-Bessemer Diesels

AFTER all the advantages of a Diesel engine have been considered such as fuel economy, safety, freedom from vibration, manufacturer's reputation for service, and all the others, the experienced user invariably bases his choice on one characteristic. Will the engine run and run and keep on running with a minimum of interruptions and expense? Whether for pleasure boat or cargo boat this is the characteristic that makes a particular Diesel desirable. It accounts for the fact that you are finding Cooper-Bessemer Diesels on such boats as Eldridge Johnson's private yacht "Caroline", and the cargo boat MV Ocelot owned by the General Navigation Company, Vancouver, B. C.

THE COOPER-BESSEMER CORPORATION

GENERAL DIESEL SALES OFFICES: SUITE 301, 25 W. 43rd STREET, NEW YORK CITY

131 State St., Boston, Mass. Hoffar's Lt'd., Vancouver, B. C. 640 East 61st Street, Los Angeles California The Pacific Marine Supply Co. Seattle, Wash.

PLANTS: MOUNT VERNON, OHIO GROVE CITY, PENNSYLVANIA

The MV Ocelot, 110' vessel, owned by The General Navigation Company of Vancouver, B. C., is powered with a 150 H. P. Cooper-Bessemer Marine Diesel Main Engine. It is engaged in cargo service.

COOPER - BESSEMER

Largest American-Built Diesel Yacht

CAROLINE, the 279-foot yacht built for Eldridge R. Johnson of Moorestown, New Jersey, by the Bath Iron Works, Bath, Maine, is the largest diesel vessel built in this country since 1926, and the largest yacht launched from an American yard this year.

The new vessel, designed by Henry J. Gielow, Inc., is a clipper-stem, white-hulled boat with a water-line length of 235 feet, a beam of 38 feet, and a draft of 15 feet. She carries a pair of 1500 horsepower Cooper-Bessemer diesel engines operating on twin screws and developing a cruising speed of better than sixteen miles an hour.

Her accommodations include quarters for a crew of 40 men, rooms for two maids and two valets, and seven guest state rooms. The owner's quarters are unusually large and are situated amidships. The single room extends the full beam of the yacht and has a depth of 14 feet, 6 inches. Two baths and two wardrobes adjoin.

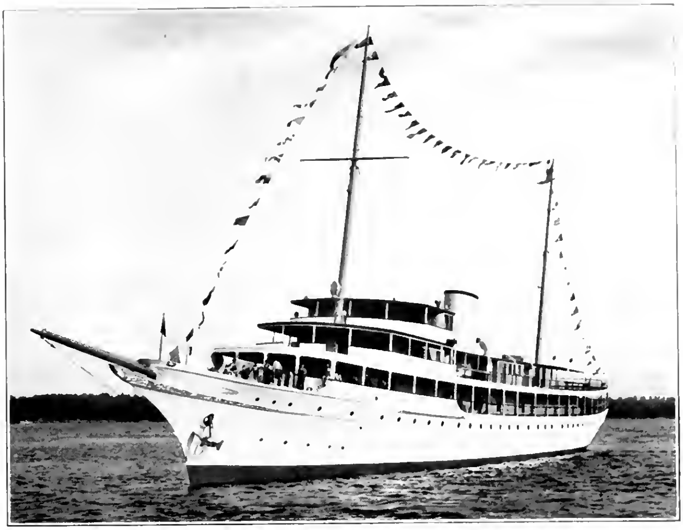
Aft are the guest rooms, with all starboard and port quarters connected by 7-foot sliding doors so that any two units may be linked together as veritable apartments. Each room has its private bath and wardrobe.

On the main deck, there is an exceptionally large living room 36 feet wide and 26 feet deep. The forward part has a fireplace flanked by bookshelves and the after end leads out to a semi-sheltered quarter deck. Between the living room and the smoking room is a small lobby leading to a passenger elevator which runs from the owner's quarters through the main deck to a laboratory on the upper deck.

Between the smoking room and the dining saloon there is a dressing and shower room so that the owner's party may change clothes after swimming without going directly to their quarters. Accommodations for the chief engineer also have been arranged on this deck.

The dining room is 29 feet wide and 26 feet deep, and connects with a pantry and galley forward. The maids have a private dining room on the starboard side.

On the upper deck is a lounge and observation room. The wireless room is immediately forward, with adjoining quarters for the operators and the captain. A full-view observation room completes the foremost part of the upper deck. On the bridge deck is the chart room and the pilot house.



With her rakish masts and stack, her high shear, and clipper bow, Caroline presents a very graceful appearance.

Deep in the hold of the yacht will be one of the largest stabilizers that the Sperry Gyroscope Company ever built for a private vessel. It has a rotor eight feet in diameter and the whole unit weights 105,000 pounds. The diesel engines used in the boat weigh more than 300,000 pounds and the whole yacht will be heated, cooled and ventilated by a single thermostatic installation. The boat will carry its own laundry, its own refrigerating plant, and will have capacity for enough fuel and oil so that she may cruise 25,000 miles without putting into port.

Captain Andrew Peterson assumes command of the new yacht.

Technical Evening Classes

New Trade Classes.—New Smith-Hughes Trade Extension Classes of the Technical Department of the Humboldt Evening High School, San Francisco, started during the week of August 10.

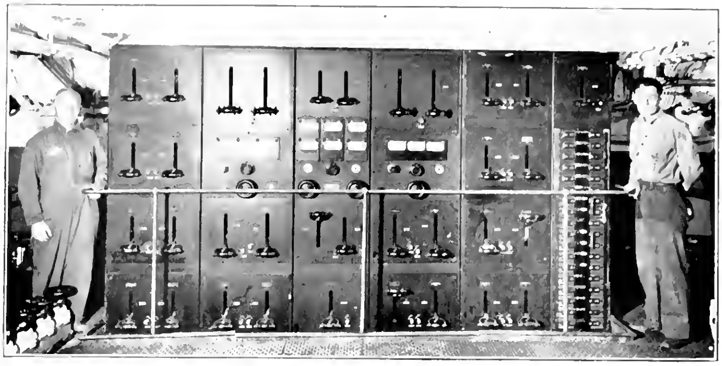
These **Free Public Classes** are conducted for the skilled workmen and apprentices engaged in the engineering and building trades. The Smith-Hughes Plan of Education for Adults provides extra financial aid from the federal and state governments to the San Francisco Board of Education for the maintenance of this type of technical and trade education.

The trade instruction includes Mechanical and Building Trades Drafting, Plan Reading, Industrial Applied Science, Industrial Applied Mathematics, Estimating, Applied Mechanics, Applied Electricity, Diesel Engine Construction and Operation, Practical and Advanced Surveying, Turbine Construction and Operation, Power House Engineering, Telephone Engineering, Practical Steel Metallurgy, Concrete and Steel Construction, Decorative Painting, Graining, Varnishing, etc., and Oxy-Acetylene and Electric Welding.

It is expected that other Trade Classes will soon be added in compliance with public requirements.

A Business and Research Cruiser

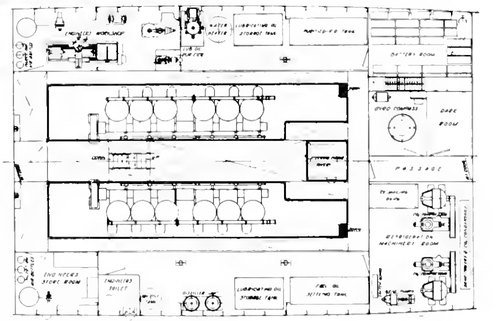
(Continued from Page 364)



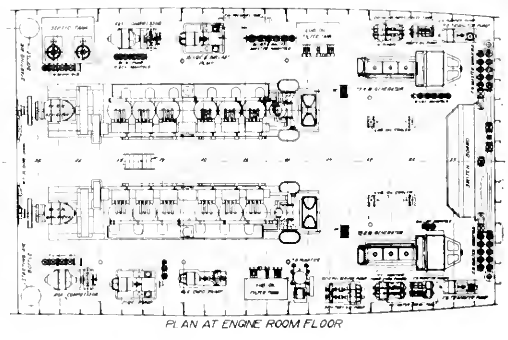
Above is shown the deadfront Westinghouse switchboard in the engine room of Velero III with Mark Hollzer, electrical engineer in charge of switchboard installation, and Allan Campbell, master mechanic.

Above: the Exide storage battery installation in the special storage battery room.

At Right: the plans of the general arrangement of machinery in the engine room spaces.



PLAN AT BALCONY



PLAN AT ENGINE ROOM FLOOR

Velero III is claimed by her designer to be nonsinkable or, rather, a three-compartment boat. Water-tight compartments extend to the weather deck in all cases. Water-tight bulkhead doors are manually operated with indicator in the pilot house showing whether they are open or closed. All outside doors are weather-tight. All air and light openings, with the exception of skylights and pilot house front, are heavy bronze framed port lights with extra thick glass. All ports in the hull have cast iron backers. All openings through lower deck (the deck at the water line) are closed by water-tight hatches. The vertical sliding water-tight doors to shaft alley are controlled at upper deck level. A double bottom extends fore and aft as far as possible, except through the deep tank. Wing fuel oil tanks are constructed outboard of the shaft alleys. In addition to the fresh water and fuel oil tanks, two trim tanks are arranged forward and one large trim tank aft. Nothing has been omitted necessary to contribute to the safety of the vessel. The owner can at all times and in any weather feel that his guests and crew are as safe as modern engineering can make them.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

Captain A. T. Hunter of General Steamship Corporation, San Francisco, chairman of the Harbor Day merchant ship life boat races, is explaining the program to Captain Angelo Canepa of the Libera liner California. Walter Dawes of the San Francisco Junior Chamber of Commerce, right, shows the Italian master the entries.

To the Propeller Club of California was given the management of the merchant marine life boat race, a feature of the Harbor Day program on San Francisco Bay, August 26.

Six vessels from as many well known lines entered this contest. The winning crew was from the tanker District of Columbia, Standard Oil Company (Calif.), time for the mile course: 10:32. Second place went to the Panama-Pacific liner crew from the California, time: 11:13. Third, crew of the Kentuckian, American - Hawaiian Steamship Company, time: 11:27. Fourth, Maliko of the Matson Navigation Company. Fifth, crew of the President Hoover, Dollar Steamship Lines. Sixth, boat from the Guatemala of the Panama-Mail Line.

The victorious Standard Oil crew received the beautiful cup presented by Bethlehem Shipbuilding Corporation, Ltd.

Captain A. T. Hunter was chairman of the committee-in-charge and his assistants were Captain J. A. Rumsey, Captain Stanley Allen, Harry Haviside, and Vernon Showell. In the absence of Captain Eugene Blake, Jr., commandant of the California Division, U. S. Coast Guard, Lieutenant-Commander F. L. Austin of the coast guard officiated as referee. Captain H. Ottzenn was official timer; and Vernon Showell was starter.

The ballast committee, for weight classifying all entry boats, comprised Harry Haviside, Captain L. H. Westdahl, Captain K. H. Donovin, and Merle C. Johnson. Judges of the finish were: Geo. Zeh, C. C. Mallory, and Thomas Plant. Course judges were: Hugh Gallagher, Tom Crowley, and N. R. Harris.

Harry Haviside's derrick and salvage barge No. 4, was the base of the racing activity, anchored off the Marina. The Barge No. 4 was the weighing-in station and official observation point, as well as the finish line. A goodly crowd was there to see the contests and enjoy the hospitality of No. 4. Ideal weather conditions made the race the most successful in the history of this colorful event.

On August 25, the Marine Committee of the San Francisco Junior Chamber of Commerce, held a Ship Model Contest at which some forty-five models were exhibited by the Junior, Intermediate, and Senior grades of model makers under the San Francisco Playground Commission.

In the Senior Grade—ages 17 to 20— there were only two exhibits, Roland Saysette taking first prize with a beautifully modeled sloop, and Clarence Gifford, second, with a model of an American merchant vessel.

In the Intermediate Grade—ages 13 to 17—there were many creditable exhibits and choice was difficult. The committee of judges awarded first place to Robert Bailey who exhibited a beautiful model of a sloop yacht, and second to Milton Grayson who exhibited a finely molded, self-propelled speed boat.

In the Junior Grade—ages to 13 —Frank Hospodarsky drew first prize with a framed picture with half-relief model of an American merchant vessel in harbor, and Buddy Vetter, second prize, with a carefully proportioned, nicely modeled small speed boat.

C. V. Lane of San Francisco has been appointed California sales representative for the Engineers Supply Company of New York, manufacturers of the telescope tube blower, an improved type of tube blower for marine water-tube boilers where space between boilers prevents use of other types of tube blowers.

"Long Hop Harry" Conners, now chief officer of the Steamship City of Hamburg of the Baltimore Mail Line of the I.M.M., formerly first officer on Steamship California. Conners was navigator of the plane Columbia on flight from New York to Scilly Isles. Now plans trans-Pacific hop!

Transfer has been announced of MAJOR JOHN S. BUTLER, U. S. Corps of Engineers, from Seattle to the department's offices in Omaha, and he will be succeeded by MAJOR CLARENCE L. STURDEVANT. Major Butler closes a four-year term in the Pacific Northwest and has completed reports on two major engineering projects. These are the proposed $1,500,000 breakwater to aid commerce in Shilshole Bay and the Columbia River Basin Irrigation Project, contemplating an ultimate expenditure of $300,000,000. Major Sturdevant comes from the Army War College at Washington, D.C.

After an extensive vacation trip to his native Scotland, CHIEF ENGINEER JOHN CARSTAIRS of the Panama-Pacific liner Pennsylvania is back on duty again, and reports a fine trip and some fine golf. Chief Carstairs reports that he enjoyed a week of golf at the famous St. Andrews links—including the run of the club house — a locker of his own—and all the playing he wanted—and all free, which should be a record of some kind.

The Oceanic-Matson liner Ventura sailed from her home port on a recent voyage with CAPTAIN ANDREW G. TOWNSEND in command. Captain Townsend was formerly commander of the Matson liner Maui. Captain Townsend relieves CAPTAIN W. R. MEYERS, who is destined to be master of the new Oceanic-Matson liner Mariposa.

Completion of a million miles at sea as master of a single ship is the record made by CAPTAIN GEORGE W. YARDLEY, commander of the Dollar Liner President Cleveland. It was the end of his sixty-first crossing of the Pacific. "The first million miles are the hardest," said Captain Yardley, in commenting on this record at Seattle. "It was in February, 1921, that I brought the President Cleveland out from Newport News, where she was built, and we have been together ever since." Captain Yardley sailed for many years in the fleet of the old Pacific Mail Steamship Company. The President Cleveland is now on the Seattle-Orient route. Besides his reputation as a transpacific navigator, Captain Yardley holds the golf championship of the Dollar fleets as well as the deck tennis championship.

"Bill" Cathcart, head of Marine Electric Company, San Francisco, whose firm now handles service and repair for U. S. Electric Tool Company. W. D. Sullivan is western factory representative.

CHIEF ENGINEER FRANK G. WHITE, who has been with the California State Board of Harbor Commissioners for the past twenty years, fifteen years of which he has been chief engineer for the Port of San Francisco, was reappointed last month at a special meeting of the Commission. During Chief Engineer White's term of office, the pier system of San Francisco has undergone almost a complete change and millions of dollars have been spent under his supervision. He ranks high with chief engineers of ports throughout the country and has been given high recognition by various organizations.

OTTO H. EISENBEIS has been appointed Port Warden for the Port of Seattle by Mayor Robert H. HARLIN, the appointment becoming effective September 1. He will succeed GEORGE E. HERPICK. Eisenbeis was selected from a field of thirty-five candidates. He was born in Port Townsend in 1887 and was educated in the public schools of that city. He entered the employ of the Northern Pacific and later entered the fishing business in the San Juan Islands. He saw service during the World War, after which he entered the shipping business, rising rapidly in his profession until he became district manager for the McCormick Steamship Company. His last position was manager of the Hayden Dock Company of Seattle.

O. O. BRITTON has been promoted to the position of purser aboard the Matson steamer Manoa. He has been paymaster on the Malolo for some time. Britton succeeds D. C. HILLIS, who has been assigned to a shoreside job in the Matson company's passenger department headquarters at San Francisco.

ALFRED G. CONQUEST, one of the oldest pursers on the Pacific in point of service, has retired. Conquest has been with the Oceanic Steamship Company for twenty-five years, his last assignment being the Sierra. J. M. FORD, who has been assistant purser aboard the Sierra, succeeds Conquest to the chief position.

He may repeat! L. K. Siversen who won last year's Propeller Club of California golf championship trophy presented by James S. Hines, publisher of "Pacific Marine Review." Russ Pratt, chairman for the coming event, is about ready to announce the date and place.

Official News *of the* PROPELLER CLUB *of* California

OUR recently established program of rotating the Tuesday luncheon chairmanships between the various versatile directors of the Propeller Club of California has developed the "turning up" of highly creditable attendance at these popular weekly meetings in the California Room of the San Francisco Commercial Club.

Current features of the Tuesday gatherings have been received with enthusiastic interest, and every program has had outstanding points of interest and educational and entertainment merit.

August 4—Jim Cronin, founder of the Propeller Club of California, was chairman of the day. The speaker was Edwin H. Walter, a fellow Propeller, who vacations from his tanker chartering business by flying each year with the United States Naval Air Reserves. "Ed" opened our eyes in explaining the efficiency of our flying units, and his description of the tactics of fleet plane usage was graphic and illuminating.

August 11 — Frank Fox took the wheel. On this day Charles W. Duncan described the mighty project for bridging the Golden Gate. As this engineering work will soon be under way, Duncan's address was timely and comprehensive, because he accompanied his story with an exhibition of drawings. As another feature of Frank Fox Day we enjoyed the songs of Charles Bulotti, a San Franciscan who has one of the world's finest tenor voices. Miss Marie Hursey was the accompanist.

August 18—Joseph Geary of admiralty law fame paced the bridge. Al Porter, one of our members, gifted in speech and deep-water experience, recited the story of Yankee clippers, a subject which can never grow old. Al Porter reminded us of the part played by ships of sail in the building of western trade and Pacific commerce. He laid before us the startlingly true records of famous voyages of sailing vessels in and out of the Golden Gate from the days of gold and forty-nine.

August 25 — Harry Haviside was chairman, and his program was as entertaining as it was entirely unique. For Harry had the San Francisco Police Department's crack athletes on deck to display their prowess in methods of combating criminal physical attack. An ancient Oriental method of grips and tactics was demonstrated. If any Propeller is assaulted with a cleaver he now knows exactly what to do.

August 26 — San Francisco's Annual Harbor Day found the Propeller Club in charge of the Merchant Marine Life Boat Race, the California Nautical Schoolship Race, and the Sea Scout Race. Propeller Club members officiating in these events were: Captain A. T. Hunter, Chairman; Captain J. A. Rumsey, Captain Stanley (Capstan) Allen, Harry Haviside (and his gigantic derrick barge No. 4), and Vernon Showell. Elsewhere in this section are further particulars of the Propeller Club's participation in Harbor Day.

Golf—Fall Outing. — Russ Pratt, chairman of the Golf Committee, is touring all of Northern California, scouting for the best possible site for our fall golf and outing event. Early in October is about the time, but exact and complete details will be available soon. So keep in training and in touch with Russ Pratt. His phone is SUtter 6750.

Captain Walter M. McFarland, manager of the Marine Department of The Babcock & Wilcox Company, retires from active service September 1.

The Babcock & Wilcox announcement of this change states that Captain McFarland, by reason of ill health asked to be retired from the service of the company. C. W. Middleton, vice-president of the company, in commenting upon Captain McFarland's resignation said, "The captain has been with us over twenty-one years and those who are at all familiar with marine matters will understand the regret with which we see him retire. Although he has given up his post as manager of the Marine Department, he has very kindly consented to give us, from time to time, the benefit of the extensive experience that he has accumulated since his graduation from the Naval Academy in 1879."

After his graduation Captain McFarland served on Naval vessels in various parts of the world and was, at one time, principal assistant to Admiral Melville, who was then Engineer in Chief of the United States Navy. He held the rank of Chief Engineer and in 1897 was a member of the board to reorganize the personnel of the Navy, which was presided over by President Roosevelt, who was at that time, Assistant Secretary of the Navy.

In 1899 he resigned from the Naval service to become vice-president of Westinghouse Electric & Manufacturing Company, which position he held until April, 1910, when he became manager of the Marine Department of The Babcock & Wilcox Company.

R. R. DAVIS, who has directed, in the past 21 years, various Westinghouse advertising activities, has been appointed apparatus advertising manager of the Westinghouse Electric and Manufacturing Company, at East Pittsburgh. His service with the company started in 1905, immediately following his graduation as an electrical engineer from the Western University of Pennsylvania, now the University of Pittsburgh. In the next five years he sought experience in engineering, sales and management and, for this season, following a course in engineering apprentice work at East Pittsburgh, went to Philadelphia as an advisory engineer and salesman. For two years he also served as electrical superintendent of the Megargee Paper Company.

In 1910 he became associated with the Westinghouse advertising department and in the ensuing period had directed the activities and had executive control of most of its divisions. In 1925 he was named assistant to manager of the department and last year became editor-in-chief.

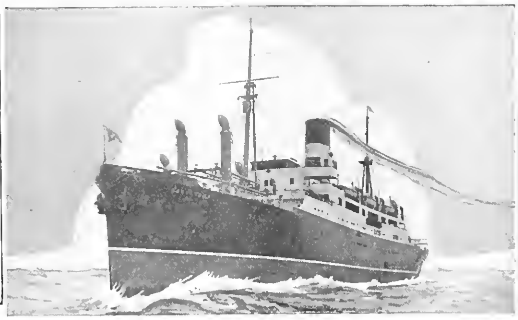
Davis had been active in the creative as well as the executive side of every form of advertising, and its associated media and methods, that has been used by the Westinghouse Company.

Bringing out the President Coolidge, and due the Golden Gate Nov. 4th, is Captain K. A. Ahlin. Seven years ago, January 5th, to be exact, Captain Ahlin inaugurated the Dollar round-the-world service with the President Harrison.

CAPTAIN ANTON W. NYGRAN, who has just rounded out thirty-five years at sea, has been appointed commander of the American Mail liner President Taft, succeeding CAPTAIN H. A. AHLIN, who has been assigned to the steamship President Coolidge. During his career, Captain Nygran has commanded nineteen different vessels ranging in size and importance from schooners to his latest command, the President Madison.

A young Canadian sailor, paraded before His Majesty, King George V, last July 28, to receive the gold medal awarded each year to the best all-around cadet on the school ship H.M.S. Conway, maintained on the Mersey by the Mercantile Marine Service Association. He was GEORGE WINRAM ROBERTSON GRAVES of Vancouver, British Columbia, the first Canadian to win the award inaugurated by Queen Victoria in 1866, and a grandson of the late CAPTAIN GEORGE ROBERTSON, who brought the Islander around the Horn for the Canadian Pacific Navigation Company forty years ago.

Young Graves will join the Canadian Pacific liner Empress of Canada as cadet officer; one of the four graduates of the Conway on the White "Empresses."

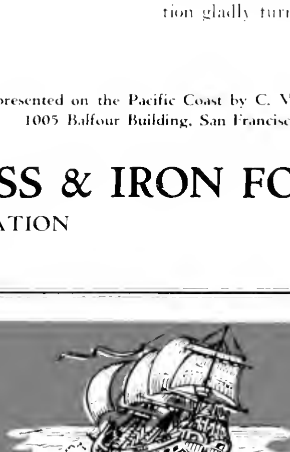


PACIFIC SHIPYARDS HAVE ALWAYS BUILT GOOD SHIPS

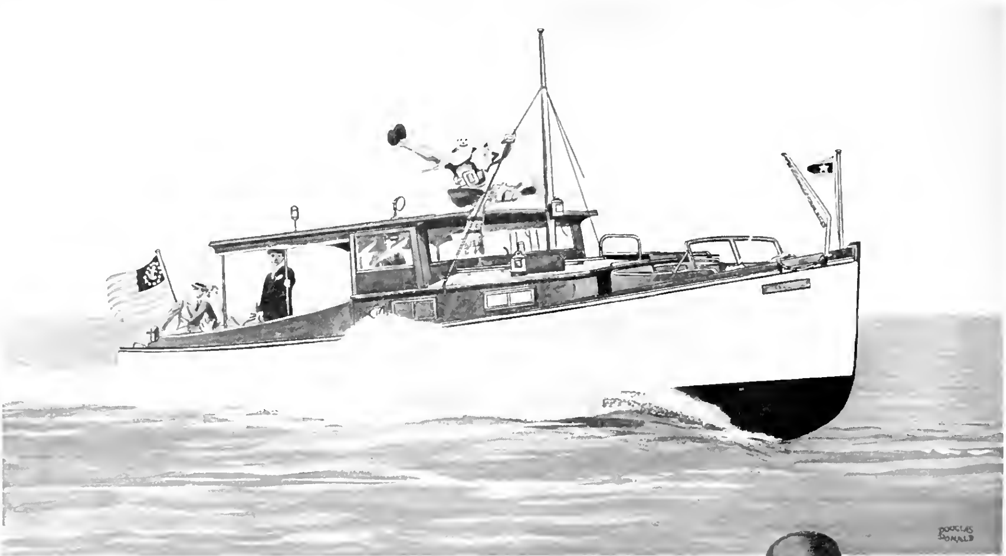
Pacific Marine Review

OCTOBER, 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION



Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST



Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII | OCTOBER, 1931 | NUMBER 10

Contents

Official Organ
Pacific American Steamship Association

James S. Hines,
President and Publisher.

Bernard N. De Rochie,
Vice-Pres. and Manager.

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

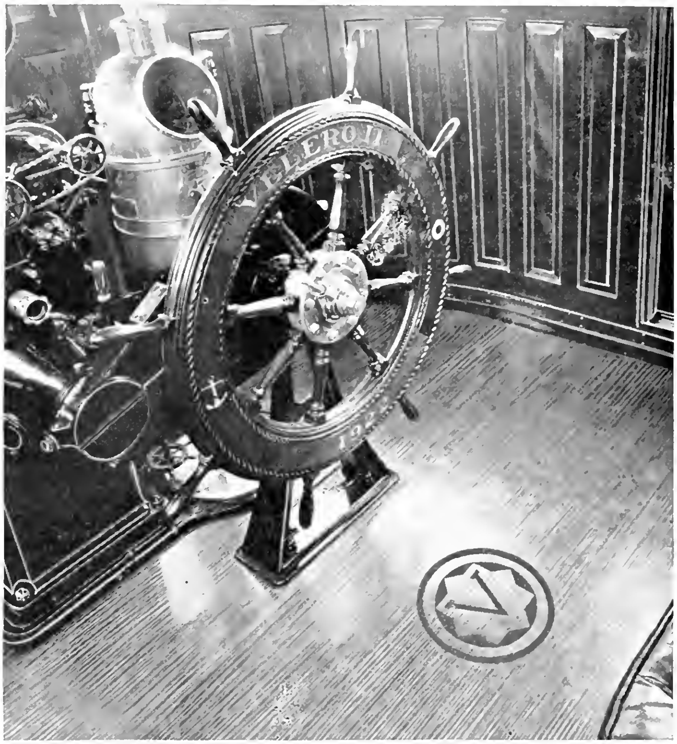
Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year; domestic, $2; foreign, $3; single copies, 25c.

Official Organ
Shipowners' Association of the Pacific Coast

Alexander J. Dickie,
Editor.

Paul Faulkner,
Advertising Manager.

Chas. F. A. Mann, Northwestern Representative, 1413 Puget Sound Bank Bldg., Tacoma, Washington.



"All's well" with the decks in the Velero II's pilot house. Note the Armstrong's inset monogram which gives an individualistic effect to this deck covering of Armstrong's Linoleum.

These decks are protected against C-O-R-R-O-S-I-O-N

SAFE from their worst enemies—briny spray and ocean air. The steel decks in the pilot house of the yacht Velero II are covered with Armstrong's Linoleum—sealed against corrosion.

The exposed deck outside the pilot house is also protected by Armstrong's Linoleum, chosen because it "stands the gaff." More than that, Armstrong's Linoleum is resilient and comfortable underfoot. It gives the deck a permanently trim look, because the Accolac-Processed surface keeps it spotproof and stainproof.

Armstrong also offers other types of seaworthy deck coverings—Linoflor, Linotile, and Cork Tile. Linoflor, the newest of these, has a water resistant backing of asphalt-saturated felt. They can all be installed on any type of deck by Armstrong's newly perfected process that seals the steel beneath.

There's an ideal Armstrong Floor for any ship. We'll send you samples of these floors. Write also for the interestingly illustrated books, "Custom-Built Floors of Cork" and "Public Floors of Enduring Beauty." Armstrong Cork Company, Floor Sales Division, Lancaster, Pa. *Armstrong branches in these port cities: Boston, Buffalo, Chicago, Cleveland, Detroit, Los Angeles, New York, San Francisco, Seattle.*

Fair weather or foul cannot bother the Armstrong's Linoleum on this exposed deck. Nor can it harm the steel plates beneath.

Armstrong's (A) Product

Armstrong's

LINOLEUM LINOTILE LINOFLOR
CORKBOARD AND CORK COVERING

FROM PAINTING BY C. R. PATTERSON

Yankee Clipper Great Republic in Her Original Rig

Pacific Marine Review

VOLUME XXVIII | OCTOBER, 1931 | NUMBER 10

Editorial Comment » » »

A Golden (?) Jubilee

THIS year might be called the golden anniversary of Steel Shipbuilding on the Pacific Coast—if Pacific Coast Shipbuilders had anỳ Golden contracts or prospects over which they could jubilate. It was in the fall of 1881 that five men in San Francisco decided to form a new corporation for steel shipbuilding and general engineering work. These five men were G. W. Prescott, Irving M. Scott, Henry T. Scott, and J. O. B. Gunn, executives and principal owners of the old Union Iron Works (a pioneer general engineering works of San Francisco), and George W. Dickie, naval architect and marine engineer.

At that time there were in the United States a few rather small steel or iron shipbuilding plants all located on the Atlantic seaboard. How, then, were these five men to establish and maintain a steel shipbuilding plant 3000 miles by rail and 10,000 miles by water from the domestic sources of their raw materials and with no available body of workmen skilled in the shipbuilding crafts? That they succeeded in building up a great shipyard is a matter of history. During the decade 1891 to 1901 the Union Iron Works of San Francisco was the best known shipyard in America and one of the world's greatest.

This success was brought about by the courage, ability, and vision of the five men named above and of a host of lesser executives trained under these pioneers or drawn into association with them by the attraction of the sheer audacity that marked this whole undertaking. There was, of course, full advantage taken of the 4 per cent. differential granted Pacific Coast navy yards and private yards in bids for new construction of naval vessels. There was, too, a practical monopoly of large steel ship repair jobs and the opportunity of large general engineering contracts. There was the United States Navy bonus for extra speed as an incentive for improvements in marine engineering and naval architecture. All of these contacting the initiative faculty of western pioneers resulted in such vessels as the battleship Oregon and the cruiser Olympia, winners of the important naval battles of the Spanish-American War. Of the Olympia it was said by European experts that she had at the time of her acceptance by the United States Navy the best balanced steam propulsion plant that had ever been turned out by any shipyard.

The plant of the Union Iron Works is still intact to a very large extent, and in many of its features it has been kept up to date. In the feature of dry-docks, for example, it is today the foremost privately owned shipyard in America. The Hunter's Point Dry Dock of the Union Plant of the Bethlehem Shipbuilding Corporation, Ltd., has for twenty years been the largest drydock in America operated by a commercial shipbuilding plant—the only such dock in America capable of docking any commercial vessel afloat today.

So far as new construction is concerned, the shipbuilding ways of this plant and of five other steel shipbuilding plants on the Pacific Coast are idle today, and are very likely to remain idle unless the people of the Pacific Coast impress upon Congress their desire to see Pacific Coast shipbuilding maintained as a key industry.

The Carter Bill will be up before Congress in the coming session. It provides a very slight differential in favor of Pacific Coast contracts. Not enough to insure profits for Pacific Coast shipbuilders, but enough to cause every shipowner and the Shipping Board to consider Pacific Coast yards when calling for bids on new construction. Write your Congressmen urging support of the Carter Bill, and you will be doing your bit to help solve the Pacific Coast unemployment problem and to reestablish an important Pacific Coast industry.

According to survey furnished the Merchant Marine Committee of Congress, approximately 81 *per cent. of the cost of an American merchant ship goes for labor—labor in actually building the ship, and the labor of producing and transporting the numerous materials that go into it.*

The Depression and Shipping

THERE is no denying but that we are in the midst, and we hope the bottom of, the greatest world depression of modern times. All nations of the world seem to be affected alike, and as shipping is the principal means of communication between the various nations, it is naturally having a very severe period of profitless operation; that is, with those ships which are being operated. Much of the world tonnage is lying idle. Our two greatest commercial rivals in the past—England and Germany—are even in a more depressed condition than is this country, but that is little consolation for us, as we sympathize with them. The inter-dependence of great nations has never been more clearly brought out than during this colossal slump in business. What affects one country adversely is almost instantaneously reflected in the business with other nations of the world. Matters cannot continue this way a great deal longer, for no matter how long other periods of depression have lasted, better times have come eventually. There are already slight signs of improved conditions in shipping affairs in this country, and there are many ships required to be built under the provisions of the Jones-White law. World trade must necessarily revive and although there is now a great excess of production over consumption among essential items of commerce, these conditions must inevitably change as they always have in the past.

Even depressions of this nature have some advantages from the lessons which people learn in such a time of adversity. When we look back a decade on American shipping and consider the woeful waste connected therewith, we may all well be appalled at the inefficiency which was then displayed in operating war-built vessels. Few, if any, efforts were made toward economy in the use of fuel or supplies, nor was any great attention paid to keeping down repairs. The past two years have been of incalculable benefit in lowering costs of operation on American ships. Any new vessels which are now contemplated are given the most serious thought as to economical fuel consumption. Although both oil and coal are greatly reduced in cost at the present time, everybody connected with the shipping industry, both constructors and operators, gives the greatest attention to minimizing the cost of power making. The operating personnel give the greatest attention to reducing the cost of repairs and appear to have become niggardly in the use of supplies when compared with the orgies of waste which took place in the ill-timed post-bellum boom in shipping. As a fine example of this reform due to these days of depression, an outstanding example is our banner American ship Leviathan. It is safe to say that her operating costs have been reduced at least a fourth as compared with the first years of her reconditioning. The personnel has been reduced, fuel costs have been greatly lessened, and the repair bills are at a minimum; the cost of food and service has been very measurably decreased but continues to be of most excellent quality, and the use of consumable stores has been cut to a minimum; yet with all these efforts towards greater economy, the ship today seems in better condition and is better run than ever before. The same great improvement in operation is shown in nearly all the American ships, so that when this depression is over (which it must be before long) the lessons learned during this time of business stress will be of inestimable value in decreasing the relative costs of operating American ships when compared with ships of other nations. There is an old adage (and the old adages which are so often quoted are filled with wisdom) which says, "In time of peace, prepare for war." Paraphrasing this, we can say, "In time of depression, prepare for prosperity," and it is a very good sign that this is now being done in our American Merchant Marine.

(From the "Bulletin" of the American Bureau of Shipping.)

Not Dead But Sleepeth

SINCE 1929 the average United States citizen has contributed his share to the mob mania for waking world business prosperity now utterly deceased, we continue to be told, for nearly two years. Since that calamitous autumn when life the world over was resolved into a series of economic tragedies, he has become unreasonably jaundiced on the subject of times which, while patently not so bright as in the brave days of Coolidge prosperity, are still, as a matter of strict factual authority, not so bad as fellow mourners would have him believe. Based on statistics, world prosperity is not dead but sleepeth; and while this sleep is troubled it is the night watch of the United States which lends confidence in an awakening and a recovery. Our citizen, pondering the blight fallen upon commercial conditions, takes too little cognizance of the influence being exerted by this country in reviving commercial well-being all over the world.

How then, in cold figures, may this power be analyzed? Thus. The United States, with 6.2 per cent. of the world's population, normally imports 12 per cent. of the value of all raw materials, foodstuffs, and manufactures purchased and sold among the nations. Possessing 33 per cent. of the world's railway mileage, 32 per cent. of its telegraph lines, 60 per cent. of its telephone lines, 38 per cent. of its improved highways, 76 per cent. of its registered motor vehicles, 70 per cent. of its life insurance, 21 per cent. of its maritime tonnage, and 15.6 per cent. of its export trade, the United States at the same time produces 19 per cent. of the world's wheat, 63 per cent. of its corn, 60 per cent. of its cotton, 66 per cent. of its refined copper, 47 per cent. of its steel ingots and castings, and 68 per cent. of its crude petroleum. Such evidences of economic potency may be indefinitely amplified, but the essential point is that during the year just past, a year of depression repeatedly emphasized, the United States continued to consume, to possess, and to produce, even if in diminished volumes, with the result that world prosperity, though possibly still sleeping, continues nevertheless to breathe.

(Editorial from Grace Log, May-June, 1931)

"Big Chief" Makes a Record

ACCORDING to word received from Honolulu, Captain "Bob" Purdy of the Young Bros. towboat Mamo (Big Chief) boasts a record for towing and barge handling that is worthy of mention. The record runs were made between Kolo (Island of Molokai) and Honolulu, a distance of 52 miles.

Starting at Kolo, the Mamo towed a barge loaded with 35,000 cases of pineapples to Honolulu, dropped it at the harbor entrance, then picked up two empty barges and returned to Kolo, where each barge was loaded with 16,000 cases of pineapples, and towed these barges back to Honolulu. Total time fifteen hours.

Captain Purdy believes that this is a record of some kind.

Present Conditions in World Shipping

IDLE tonnage, according to Lloyd's Register, increased by 16 per cent. during the first six months of 1931, resulting in approximately 9,653,000 gross tons of laid up bottoms for July 1, 1931.This figure is 77 per cent. greater than that given in the same authority for July 1, 1930. Thirty-nine per cent. of the world tonnage laid up between January 1 and July 1, 1931, or 592,000 gross, was British tonnage, 27,000 gross, or 2.3 per cent. United States flag tonnage.

Judged by full cargo freight rate indices, the rates on principal sea routes are practically unchanged as compared with those for the first half of 1930. As of July 1, there were in the world's shipyards under construction 1,819,000 gross tons, which is 1,217,000 gross tons, or approximately 40 per cent., less than the work in hand July 1, 1930. Great Britain had 553,000 gross tons under construction, or 835,000 tons less than the same date last year, and the United States had 299,000 gross tons building, a gain of 70,000 tons. France and Italy also show substantial gains. Germany and all other shipbuilding countries record losses.

In steel and iron steam and motor vessels of 100 gross tons or over, the world has available 65,161,000 gross tons. Of this tonnage, Great Britain and her dominions own 22,635,000 gross, the United States comes second with 10,114,000 gross, Germany third with 4,219,000 gross, Japan fourth with 4,188,000 and Norway fifth with 4,025,000 gross.

Classifying this total tonnage, we find 8,550,000 gross tons of tankers which are owned mainly by three countries, the United States leading with 2,513,000 gross, followed by Great Britain with 2,353,000 gross, and Norway with 1,450,000 gross.

Motorships aggregate 9,146,000 gross tons out of this total. In motor vessels Great Britain and her dominions lead with 2,711,000 gross, followed by Norway with 1,620,000 gross. The Netherlands with 684,000 gross, and United States with 625,000 gross.

In volume of freight offerings, there has been a decided decline as compared with the first half of 1930, the volume indices for United States showing a decline of 16 per cent. for imports and 22 per cent. for exports. Similar indices for United Kingdom ports show approximately 30 per cent. decline in export volume and about 5 per cent. decline in imports.

Panama Canal traffic declined by 2,000,000 tons for the six months period of 1931 as compared with 1930, and for the first five months of 1931 Suez Canal traffic declined by 1,115,000 gross tons.

American Seamanship Prevents Loss of Life

THE following exchange of telegrams followed the rescue of the passengers aboard the Panama Mail liner Colombia, which was driven ashore in a gale on the island of Santa Marguerita, 670 miles south of San Pedro, California, on September 13. Both messages reflect justifiable pride in the morale of the American merchant marine.

"Victor M. Cutter, president,
United Fruit Company,
Boston, Mass.

Accept our heartiest thanks for the prompt response and splendid seamanship with which the United Fruit steamship San Mateo rescued from the boats all the passengers and crew of the steamship Colombia stranded off Point Tosca, Lower California, Saturday night. The prompt establishment of communication, the disembarcation of 114 passengers and 120 officers and crew into the boats during a severe storm after midnight and the rescue of all, without loss of life, or injury, and their subsequent transfer to your steamer La Perla on which they are now proceeding safely to their destination in California is, in our opinion, convincing evidence of the efficient seamanship of the American merchant marine. Please extend to the masters, officers, and crews of the San Mateo and La Perla our grateful appreciation,—

Edward T. Ford,
President, Panama Mail Steamship Co."

"Edward T. Ford, president,
Panama Mail Steamship Company,
New York, N. Y.

We very much appreciate your message regarding services performed by steamships San Mateo and La Perla. We were very glad indeed to be of assistance in this situation. I wish to express to you our sympathy in the loss of the boat but at the same time congratulations in not losing any lives. All available reports which have come to us pay high tribute to the magnificent work of the officers and crew of the Colombia while abandoning ship. We believe that the launching of life boats from the Colombia without loss of life or injury is an outstanding example of American seamanship. With kindest regards,

V. M. Cutter."

Errata in Recent Issues

On page 316 of the August issue of Pacific Marine Review, in the article describing the propulsion machinery of the Steamship President Hoover, the sentence "Thrust is taken on independent Kingsbury two-collar type bearings immediately aft of the motors" should read "Independent Kingsbury two-shoe type bearings." Kingsbury bearings of single collar multiple shoe construction can handle much heavier loads than are involved in the propulsion of the President Hoover. In fact, the largest Kingsbury thrust bearings afloat are all single-collar jobs.

The article "Notes on the Electric Drive," by H. L. Seward, beginning on Page 371, September issue, Pacific Marine Review, should have been credited to the "Bulletin" of the American Bureau of Shipping.

On page 375 of the September issue, in the very timely article by H. Harris Robson on "Marine Engineering Management," the diagrams were switched, so that they appeared over the wrong captions. Fortunately the legend incorporated in each diagram made this error so apparent that there was no danger of anyone mistaking the real meaning of the graphs.

Pacific
World Trade Conference

A Resume of Some of the More Important Addresses with Particular Reference to Pacific Coast Shipping

UNDER the leadership of A. F. Haines of Seattle, President of the Pacific Foreign Trade Council and executive vice-president of the American Mail Line, the Eighth Annual Convention of the Pacific Foreign Trade Council was brought to a very successful culmination in Oakland on September 17 and 18. A clear idea of the purpose of this meeting was set forth by President Haines in his opening address as follows:

"Ten years ago a small group of men considered it necessary and desirable to start the organization of the Pacific Foreign Trade Council. The original purpose of this organization can be summed up in the slogan 'Pacific Coast Unity for World Trade Expansion.' At that time there was felt a need of getting together for the exchange of ideas and ideals, an educational spot for general discussion of the importance of foreign trade in order that those interested might exchange technical and trade data, also to educate the public to the necessity of foreign trade as a means of prosperity.

"It was for these purposes that there was formed a federation of the maritime commerce and foreign trade committees of Pacific Coast chambers of commerce and boards of trade to discuss production and distribution at home and abroad. To-day our organization stands as an important and influential business organization.

"On the surface it may appear that the various ports and countries along the Pacific Coast of North America are rivals in foreign fields but we are growing to realize that whatever benefits one benefits all; that the exchange of views, discussion of methods, and spreading of information is highly desirable. This, then, is the duty and aim of the Pacific Foreign Trade Council."

Mr. Haines, a ship operator of long experience, has always been a constructive booster for Pacific Coast products and the Pacific American merchant marine, so we find him running true to form and closing his address with the following conclusions:

"**Pacific Growth.**—In the last twenty-five years the population of California, Oregon, and Washington has increased 170 per cent., bringing the present figures up to six and a half million persons. They manufactured three and a half billion dollars worth of products in the last census year, which is 60 per cent. of the value of the total production by these states. Crops and livestock represent 29 per cent.; and the remainder is divided between minerals and fisheries.

"Lumber ranks first in the total value of output, and constitutes nearly one-sixth.

"Petroleum and its products is the second largest industry and contributed more than one-tenth of the value of the Pacific Coast products in 1925 (the last government census).

"The canning industry is the third largest on the Pacific Coast and had a value of output in 1925 of over 200 million dollars, or one-third of the total of the entire country.

"There are 220 establishments in the United States Pacific Coast region, without Canada, engaged in manufacturing flour and feed, and the aggregate value of the products of this industry is more than 106 million dollars. The wheat production of the Pacific slope is 67 million bushels.

"It is very interesting to make a comparison of figures in this regard, which will give us an idea of just what proportion of the 'world's responsibility' we on the Pacific carry:

"In 1913 the total world commerce was 41 billions of dollars. Six billions of this, or 14 per cent., was handled by the countries of the Pacific area.

"In 1929 the total world commerce was 67 billions, and the Pacific area countries did 21 per cent., or nearly 14 billion dollars.

"Measuring the trade of this sixteen-year period in terms of United States business, we find from 1913 to 1929 a gain for the United States of 125 per cent. The Atlantic districts gained 96 per cent., the Gulf district 120 per cent. The Pacific Coast showed a gain of 306 per cent., or in dollars from $275,752,000 in 1913 to $1,118,558,000 in 1929.

"With an increase of eight billion dollars of world commerce handled by the countries of the Pacific area over a period of sixteen years, it is small wonder that there is a definite need for business men to turn attention to the guidance of these enterprises.

"The total ocean-borne trade of the United States ports in 1930, both foreign and domestic, inbound and outbound combined, exceeded 316,000,000 cargo tons. Of this total 27 per cent. moved through Pacific Coast ports. In the outbound traffic of 1930, foreign and domestic combined, Pacific Coast ports handled 46,000,000 cargo tons, or 29 per cent. of the entire outbound ocean movement. In the inbound ocean traffic of 1930, foreign and domestic combined, Pacific Coast ports handled approximately 38,500,000 tons, or 24 per cent. of the total.

"The figures showing that three Pacific Coast states carry 27 per cent. of the entire country's commerce and industry should bring a realization of the importance of the Pacific slope and of the mutual obligations and responsibilities existing between this section of the country and the rest of the United States and the interdependence of all countries."

After this auspicious opening, there followed two days of excellently programmed meetings featuring a large number of meaty papers on timely subjects prepared and delivered by experts. From these addresses we have culled excerpts especially interesting to the marine fraternity.

Uniform Ocean Bills of Lading. By Ira S. Lillick.—A very thorough and scholarly paper which outlines the trends leading up to and the present status of "the Hague Rules," and concludes with the following persuasive plea for the official adoption of the Uniform Bill of Lading under those rules by the governments of all maritime nations:

"From the standpoint of the shipowner, conditions the world over make them dependent upon shippers for their profits. It would seem that to cooperate with them would, in the end, be more profitable. No matter what the legal obligations of the carriers, if only they are the same, all carriers will be on a competitive equality. Eventually the cost of conducting the business must be reflected in the freight rate, and steamship owners can agree with the cargo owners if only international uniformity is secured.

We have only one definite basis upon which to formulate an idea of whether the Rules in practice would be successful. They have been in force in England since January 1, 1925. With six years of experience in the practical operation of the Rules, the British steamship owners are a unit in their support of them. No cargo leaves an English port to-day without being subject to a bill of lading in form the same as that required by the Hague Rules. Since 1925 they have worked exceptionally well. The amount of admiralty litigation in the British courts under the Hague Rules, as compared with our litigation here, resulting from the different forms of bills of lading in use in the United States, has been truly amazing. During this whole period of six years there have been perhaps only 15 or 20 litigated cases in England, and here, almost as many cases as that are commenced in our own District Court in the Northern District of California in a few months. Multiply this by the cases commenced in other jurisdictions in the United States, and the loss to the interests involved in attorneys' fees and legal costs alone are staggering.

If, and when, a uniform ocean bill of lading is adopted internationally, every country will profit equally. The adjustment of rates as well as risks upon an intelligent basis in cargo and P. and I. insurance will be possible; and many causes of friction, litigation, and loss as between shipowner and shipper will be removed."

Pacific Coast Foodstuffs in International Trade. By Alonzo E. Taylor (Food Research Institute, Stanford University)—"Foreign commerce consists of two functions; namely, production of goods available for export and the trading of these goods into export for distribution in foreign countries. In the long run each of these functions must yield a profit to the enterprise involved, if the service is to endure. We gather that to a considerable extent producers of agricultural products which have been exported during the past decade from our Pacific states have not raised them at a profit. When the producers do their own exporting, the relation of profit or loss in the entire process ought to be apparent; but when the exporters are a special class, these relations may not be recognized. A certain duration of the conduct of business for volume without profit is possible in modern society; but it would be wise for exporters and shipowners to realize that during the next decade the exports of agricultural products from our Pacific Coast states will tend to decline unless the products are raised at a profit to farmers.

If one will trace the exports of agricultural products from our Pacific States to their destinations, one will be brought to realize the extent to which the countries of destination have low standards of living. In northern European countries the standard of living, while below ours, is relatively high. In South and Central America the standard of living is still lower. In Asia the standard of living is so low that there is more or less continuous pressure of population on food supply. Agriculture in our Pacific States is for the most part not to be classed as low-cost production. Our endeavors to stimulate export trade in foodstuffs from our Pacific States thus bring us into the somewhat anomalous position of endeavoring to sell relatively high-cost products to countries with low purchasing capacities.

The export of agricultural staples from our Pacific Coast states must be maintained if widespread contraction in acreage is to be avoided. Of this, wheat is an excellent illustration, and it is not going too far to say that the growing and milling of wheat on the Pacific Coast were to a large extent established for the purpose of supplying foreign markets. The international trade in staples is conducted on a very narrow margin, and its continuation implies foreseeable rates of exchange, based on possibly depreciated but at least standardized currencies. It is thus necessary to emphasize the importance to our Pacific Coast states of an enduring stabilization of the relations of gold and silver in Asia.

Finally, it is to be observed that while the propulsive impulse in foreign trade is highly commendable, it can be exaggerated. Merely to get goods out of the country is not necessarily and inherently a benefit. In the long run the dumping of goods is not a benefit. There is such a thing as modern mercantilism, the somewhat masked survival of the historically outworn doctrine that it is indefinitely beneficial to export goods in exchange for money. The best corrective of the spirit of mercantilism is active and cooperative recognition of the doctrine that an enduring export trade must bring profit to producers as well as to merchants, bankers, and shipowners."

Development of Tourist Travel as an Aid to Commerce. By George S. Neil (District Passenger Agent, Dollar Steamship Lines at Los Angeles).—"You, who distribute merchandise to the four corners of the earth, and we, who book passengers for the far-flung frontiers of civilization, have a common object in view—that of educating the public. By placing American merchandise on the shelves in China, Java, or India; by sending American-made transportation equipment to Japan, Egypt, or Italy; by installing American sanitary devices in the hotels of Asia, Africa, and Europe you have made it easier for us to sell passenger tickets. By using our best efforts to stimulate travel to all parts of the world we aid in erecting a market for your goods abroad, whether it be by the outright purchase of a small trinket or the payment of a huge hotel bill. So there can always be but one object for both of us—the stimulation of foreign trade and travel."

Steamship Dinner Shippers' Conference

Many excellent short papers covering various Pacific trade routes and the commodities shipped thereon were featured at the dinner conference between Pacific ship operators and Pacific shippers. We print the following abstracts:

Direct European Trade. By H. S. Scott (President, General Steamship Corporation.—"During the past ten years we have seen this remarkable development take place. Large quantities of lumber, wheat, barley, fresh, dried, and canned fruits, fish, metals, and many other commodities, never before shipped direct to Europe, now move in a substantial way from British Columbia, Washington, Oregon, California, and our inland Western States, to the United Kingdom, Scandinavia, Germany, France, Belgium, Italy, and other parts of Europe. Exports of dried fruits alone have run far over 200,000 tons in a single year. Europe takes from 85 to 90 per cent. of our export of this commodity. Lumber shipments have exceeded 350,000,000 board feet annually. Shipments of wheat have reached as high as 65,000,000 bushels, and the movement of flour has equalled 375,000 barrels yearly. Last year the total export movement of fresh apples from Pacific Coast ports, reached the astounding total of 8,000,000 boxes, of which Europe took close to 90 per cent. This is a business that has been entirely created in the brief period since 1920.

We simply cannot afford to take any chances that might jeopardize this important trade by experimenting any further with tariffs or other trade barriers. We already have a situation where the trade is largely a oneway movement, because we are importing little, if anything, from Europe to the Pacific Coast. But the evils of our tariff policy do not cease there. Unfortunately, there is also a growing tendency on the part of the European nations to enact retaliatory measures against our products. I believe that it is clear that we on the Pacific Coast have far more to lose than to gain through any policy that discourages reciprocal trade with Europe. As for the future—given a reasonable chance for continued normal development to take its course—I am confident that we shall also see amazing strides in the next ten years. Faster ships will race to Europe, bringing that tremendous market with its great possibilities closer and closer to our doors."

South America—East Coast. By Ralph W. Bybee (Foreign Freight Agent, McCormick Steamship Company).—"The principal cargo carried from this coast to South America is lumber. The principal cargo homebound has been coffee. Lumber has increased from 19 million feet in 1925 to 78 million feet in recent years, and coffee has increased from 288 thousand bags in 1922 until this year it is conservatively estimated it will reach approximately 650 thousand bags.

This route when first opened consisted of about five or six sailings per year. To-day there are approximately 30 sailings per year in each direction. Before the inauguration of this trade route, what little business, if any, that was done between this coast and the East Coast of South America was consummated by New York brokers and all freight from this coast moved via the Atlantic seaboard. This, of course, was not conducive to the promotion of our own Pacific Coast products and industries. In 1928 refrigerated equipment was added to this route and to-day there is ample space to take care of all the requirements. The sale of apples, for instance, which has always been handled by New York brokers, is to-day handled by Pacific Coast brokers and forwarded directly from this coast. It is obvious that a trade route cannot be successfully maintained without reciprocity. This is especially noticeable with the Latin American countries. In the Argentine there is a slogan "Buy From Those Who Buy From Us." Therefore, some method of developing importations must be devised."

The Far East. By S. Nakase. (Nippon Yusen Kaisha)—"There is a great deal of interest for shippers and foreign traders in the figures on the growth of transpacific trade, particularly between North America and Japan, since the great World War. While Japan's exports to the United States and Canada before the war were $101,000,000, or 34 per cent., of Japan's total exports and the imports were $49,000,000, or 16 per cent., of total imports, to-day Japan's exports to North America amount to $396,000,000, or 43 per cent., of Japan's total exports and her imports from North America are $321,000,000, or 32 per cent., of Japan's total imports. This shows an amazing growth; a fourfold increase in exports while imports have multiplied seven times in Japan's trade with the United States and Canada during the last decade. To me it is a wonderful thing that 43 per cent.of all exports and 32 per cent.of the total of imports to Japan are from the United States and Canada constituting the major portion of transpacific foreign trade.

The trade of China with the United States in 1929 was $166,000,000 in exports and $124,000,000 in imports. Besides, the trade between Hongkong, the Straits Settlements, Philippines, and Java with the United States and Canada are also contributors to the transpacific trade routes.

Thus you will all realize that, while the United States and Canada are the important supporters of industry of Japan, China, and other oriental countries on one hand, those oriental countries on the other hand are no mean customers of the North American goods.

It is our duty in the steamship business to link these great commercial fields of the Pacific Ocean. I believe the record of the transpacific shipping lines is a record of progress and achievement. The lines on the Pacific have accepted the challenge of the new world economic system and are doing their best in placing faster and finer ships in the services; always seeking the cooperation of the industries concerned for greater accomplishment by all of us."

West Coast of South America. By F. L. Doelker (Assistant Vice-President, Grace Lines, Incorporated).— "Trade between the United States and the countries located along the West Coast of South America has increased tremendously due to the many steamer lines now giving regular service between Pacific Coast ports of North America and the West Coast of South America.

The industrial development of our Pacific Coast has been rapid. Manufacturers are enabled, by reason of improved steamer services, to export a wider range of highly manufactured products than formerly moved in this trade. As the export trade is essential to the continual prosperity of agriculture and industry, the value and importance of regular steamer service to the great market of the west coast of South America is so manifest as to require no further comments.

Imports from the West Coast of South America, namely nitrate of soda, sugar, coffee, cocoa, lead, copper bars, gold, silver, lead, and copper ores, have been increased and diversified; and it is hoped that the volume will continue to increase. In order to develop trade in fresh fruits and other perishable commodities these steamer lines during the last two years have equipped their vessels with refrigerated space so that perishable commodities are now being sent to the West Coast countries. At the present time the steamer lines have more cold storage space than the trade warrants, but with the increased exchange of commerce it is hoped that in future it will be necessary for the lines to enlarge their refrigerated space. In order to handle perishable commodities, cold storage facilities have been erected at some west coast ports; but in order to increase the volume of fresh fruits and other perishable commodities it will be necessary that cold storage facilities be erected at all the principal west coast of South America ports, and it is hoped that the various interested countries will give this matter their serious consideration. In order for the steamer lines to give a regular and dependable service between the various countries, it is of utmost importance that vessels be given prompt dispatch at all west coast ports. It is also important that government dues, such as lighthouse and hospital dues, port charges, and other fees, be kept in mind so that these may remain as low as possible.

The respective governments should also take the quarantine restrictions into consideration with a view of working out more reasonable regulations which would not work a hardship on the respective steamer lines."

Exports Dying with Silver. By Senator Key Pitman.— "At the present market price of silver, which is less than twenty-eight cents an ounce, the actual intrinsic value of the Chinese dollar is only about twenty-two cents. The Chinaman, therefore, with his silver dollar, can only purchase approximately twenty-two cents worth of our products. Stated in terms of exchange, the Chinaman has to exchange four and one-half of his dollars for one of our dollars, with which to pay the purchase price of our products.

In view of the fact that his earnings have not been increased by reason of the fall in price of silver, it is self-evident that he cannot afford to purchase our products upon any such exchange basis. The Chinese, therefore, have practically ceased to buy our fruits, grains, flour, lumber, meats, cotton goods, automobiles, and other manufactured products. In fact, he is buying from the United States, Great Britain, and other gold standard countries only those things that necessity demands. This condition is true to a great extent in our trade relations with all silver money using countries, whether they be nominally on a gold standard basis or not.

The far-reaching effect of this deplorable condition upon our trade and commerce can be estimated when we realize that over 90 per cent. of the governments of the world and over half of its people have nothing with which to purchase property, conduct trade, and measure wealth, except silver.

Through the artificial depression of the purchasing power of silver we have isolated from us such silver money using countries and people and are rapidly forcing them to become independent of our products. China is rapidly meeting the necessity of doing without our products or products of other gold standard countries. She is planting additional large acreage to cotton, wheat, and tobacco and establishing herds of sheep upon the Manchurian hills. Gold is flowing into China for the purpose of purchasing cheap silver with which to build factories and to take advantage of the cheap labor with which to produce those manufactured articles that heretofore we have successfully sold to her people.

It is not the poor Chinaman who is suffering from this condition, but the poor American farmer, producer, and business man who sold off his surplus wheat and cotton and tobacco and lumber and fruits and meats, manufactured products to the Chinese people. The Chinaman, in spite of the high taxes, is prosperous in those parts of China not affected by floods or war disturbances. I saw no signs of abnormal unemployment in Shanghai, Hongkong, Tientsin, Peking, Hankow, or other great cities removed from the catastrophes of nature and war.

Let it be remembered that China is a country in area larger than the United States; in fact, almost equal in size to the United States and Mexico combined. The present Communist war in China only involves about three provinces which may be compared to the States of Nevada, Utah, and Idaho as to area and as to remoteness from the great coast cities. There are probably not over 300,000 men involved in such military operations out of the four hundred millions of population of China.

What is the remedy? An international agreement to abandon or suspend the policy and practice of governments of debasing and melting up circulating silver coins and of throwing the silver on the markets of the world as bullion. This is the plan approved by the United States Senate. The Senate by unanimous vote adopted a resolution, that the President is requested, if he deem it compatible with the best interests of our government, to call or obtain an international conference or conferences for the purpose of obtaining an agreement among nations, if possible, to abandon the policy and practice of debasing and melting up silver coins and selling the silver as bullion on the markets of the world; and further, to obtain an international agreement, if possible, as to the future uses and status of silver as money."

Pacific Coast Shipyards Have Always Built Good Ships

MUCH interest was developed in the revival of Pacific Coast Shipbuilding by the session devoted to that subject at the Eighth Annual Convention of the Pacific Foreign Trade Council. This session, under the chairmanship of J. A. H. Kerr, president of the Los Angeles Chamber of Commerce, was held for the purpose of developing some method of obtaining for Pacific Coast shipbuilding plants an equitable share in the contracts for new construction developed under the Merchant Marine Act of 1928.

The set program consisted of four masterly addresses, as follows: "Advantages of the Pacific Coast for Ship Construction and Its Relation to Foreign Trade," by H. J. Anderson, Secretary, Pacific Coast Dry Dock Association; "Pacific Coast Should Share Equitably in Ship Construction made Possible by Federal Aid," by Congressman A. E. Carter of California; "American Shipping and Shipbuilding," by Congressman Arthur Free of California; and "Relationship between American Merchant Marine and Foreign Trade," by Captain S. S. Sandberg, Pacific Coast member, United States Shipping Board.

Mr. Anderson's address struck the keynote of the session as developed in the following excerpts and resulted in the complete endorsement of the Carter Bill by resolution of the Pacific Foreign Trade Council.

The benefits of the Jones-White Act, although far reaching, fall about 3000 miles short of reaching far enough. They fail to extend to the Western Seaboard, and the activity in new ship construction occasioned by the passage of the Act is now all concentrated in a small area of the North Atlantic Coast.

Viewing this situation from an economic standpoint as well as from the angle of the National Defense it is bad public policy to concentrate an industry as vital to the welfare of the Nation as is shipbuilding into one small section of the country.

The Congress of the United States long ago recognized that steel shipbuilding could not be profitably carried on on the Pacific Coast in competition with the eastern shipyards because of their location so far from the source of supply of materials necessary for steel ship construction. Realizing the importance of maintaining established steel shipbuilding yards on this coast and the training of men and boys in the shipbuilding trades, Congress granted a 4 per cent. differential to Pacific Coast yards in bidding on naval vessels. This differential enabled the yards of the Pacific Coast not only to build naval vessels, but because of the "back log" of naval work it made possible the maintenance of the yard organizations which permitted the Pacific Coast shipyards to successfully bid on merchant work. Since the World War this differential has been abolished and not a single contract for naval construction has been awarded to a commercial shipyard on this Coast.

Private shipyards need this "back log" of naval work, for merchant work alone will not be sufficient to maintain the shipyards in a normally active state.

Certainly the authors of the Jones-White Act, which was designed to create new merchant vessels in American yards, had no thought of discrimination when they framed that legislation. Senator Jones is from the West Coast, and the shipping and shipbuilding interests of the West stood solidly behind the measure. The first thought was a merchant marine built in America and owned by Americans, and no provisions were made for the small differential in cost which would enable the West Coast to participate in the new construction program. Because of this **not one dollar of this ship construction money has gone to a Pacific Coast shipyard.**

In order to place the shipyards of the Pacific Coast in a more equitable position to bid on contemplated new construction contracts made possible by the provisions of the Jones-White Act, Congressman Albert E. Carter, after consultation with his colleagues, Mrs. Kahn, Mr. Welch, Mr. Free, Senator Jones, and members of the Shipping Board, introduced an amendment to the Merchant Marine Act providing for a differential of one-half of one per cent. in the interest rate on monies loaned to construct ships under the provisions of the Jones-White Act providing said ships be constructed in Pacific Coast shipyards.

The effect of this legislation might best be explained in the case of a hypothetical ship the contract price of which might be $2,000,000. Under the provisions of the Jones-White Law, the government would lend the shipowner $1,500,000 payable in 20 equal installments over a period of 20 years with interest at three and one-half per cent. If the Carter Amendment became a law and the shipowner built in a Pacific Coast shipyard the interest rate would be three per cent. over a like period. This would mean a total repayment of principal and interest under the present law of $2,051,250 and under the proposed Carter Amendment it would mean a total repayment of principal and interest of $1,972,500, or a difference in interest payment of $78,750.

This we do not believe sufficient to influence eastern shipowners to build vessels in West Coast yards; but provided a shipowner desired to favor a Pacific Coast yard it would place the bid of a West and East Coast shipyard on a more equitable basis because the amount mentioned, $78,750, just about equals the freight charges on materials for vessels of this size between the point of origin and an East and West Coast shipyard. Thus a Pacific Coast shipyard could be $75,000 higher than an East Coast yard in its original bid, and should the shipowner desire to build in a West Coast yard by taking advantage of the Carter Amendment he could do so without suffering any financial loss attendant to his loyalty to this Coast.

The Carter Bill has received the endorsement of practically every chamber of commerce on the Pacific Coast. New ship construction contracts in the yards of this Coast will mean the distribution of millions of dollars for labor and materials on this coast, and the return of prosperity in which practically every industry and business has a share.

American Ships in World Trade

By S. S. Sandberg
Commissioner, United States Shipping Board

THE American merchant marine includes a total of 25,000 vessels of five tons and over aggregating 16 million gross tons. This total fleet is made up of 6100 steam vessels of 12,800,000 gross tons; 12,000 motor vessels of one million tons; 1500 sailing vessels of 800,000 tons; and 5400 unrigged vessels of 1,400,000 tons. This fleet furnishes employment for 203,000 men.

A segregation by sizes shows that the total fleet contains 14,000 vessels of less than 100 gross tons; 8100 vessels between 100 and 1000 tons; 800 vessels between 1000 and 2000 tons; and 2100 vessels of 2000 gross tons and over.

Our total fleet is exceeded by only that of Great Britain and, in the highest class of seagoing steam and motor vessels of 2000 tons and over, we have 2045 vessels as against 3054 owned by Great Britain. Japan ranks next with 635 vessels in this class, followed by Norway with 585, Germany with 575, France with 548, Italy with 537, and the Netherlands with 477.

Foreign Trade Fleet.

In 1930, our foreign commerce included the services of nearly 5000 vessels of 24 million gross tons, flying the flags of 30 countries. Of this great fleet, 4320 ships of 22 million tons participated in our overseas and nearby ocean borne foreign trade and 607 vessels of 2,000,000 gross tons were employed in Great Lakes foreign trade. In the ocean trades, 1334 American flag vessels of 6,200,000 tons participated, while vessels of 29 foreign nations also engaged in these trades numbered 2986 of 15,800,000 tons. United States vessels dominated the Lakes trade, having in that service 1,300,000 gross tons.

Vessels engaged in our foreign trade transported 104,700,000 tons of cargo, making 30,000 entrances at American ports, bringing in 49,800,000 tons, and 30,000 clearances carrying out 54,900,000 tons.

In 1930, our total water borne foreign commerce was divided into 70 per cent. dry cargo tonnage and 30 per cent. tanker tonnage. In the overseas trades dry cargoes constituted 77 per cent. of the total tonnage moved while 23 per cent. of the overseas traffic was carried in tankers. In the nearby foreign trade, which, of course, includes the territories from which we received large crude oil imports, dry cargoes constituted 44 per cent. of the total cargo tonnage and tankers carried 56 per cent. of the total. In the Great Lakes trades nearly 99 per cent. of the tonnage moved was dry cargo and only a little more than one per cent. was carried in tankers.

American flag vessels made a total of 25,000 or 41 per cent. of the total number of entrances and clearances, and carried 42,100,000 tons or 40 per cent. of the total amount of freight transported. The remainder of the entrances and clearances, numbering 35,000, were made by vessels of 29 other countries which carried 62,600,000 tons of freight.

Incoming American vessels made 42 per cent. of the total number of entrances and brought in 51 per cent. of the total imports received, while outgoing American vessels made 41 per cent. of the clearances and carried 31 per cent. of the tonnage exported.

Nearly 66 per cent., or 39,300, of the total entrances and clearances were made by vessels with cargo, the remaining 20,700 having entered or cleared in ballast. The loaded vessels were divided between 19,400 entrances, equaling 65 per cent. of the total inbound, and 19,900 clearances, representing 66 per cent. of the outbound vessels. Approximately 62 per cent. of the American flag entrances and 56 per cent. of the clearances were with cargo.

Types of Vessels.

The combination passenger and freight vessels made 32 per cent. of the entrances and clearances during 1930, carrying 8,163,000 tons, or 8 per cent. of the total freight volume. In the overseas trade these vessels made nearly 21 per cent. of the entrances and clearances and carried nearly 11 per cent. of the cargo; in the nearby ocean trade they made 33 per cent. of the entrances and clearances and carried about 7 per cent. of the cargo, and in the Great Lakes trade they made 40 per cent. of the entrances and clearances and carried only about 1/8 of 1 per cent. of the cargo.

The freighters made 50 per cent. of the total number of entrances and clearances in 1930 and carried 63,284,000 tons of freight or more than 60 per cent. of the total cargo movement. In the overseas trade this type of vessel made nearly 61 per cent. of the entrances and clearances and carried about 66 per cent. of the cargo; in the nearby ocean trade they made 40 per cent. of the entrances and clearances and carried 34 per cent. of the cargo, and in the Great Lakes trade they made 55 per cent. of the entrances and clearances and carried nearly 95½ per cent. of the volume.

Tankers, designed for carrying liquid or semi-liquid cargoes in bulk, such as petroleum products or molasses, made 12 per cent. of the total entrances and clearances in 1930, and carried 31,704,000 tons of cargo, or more than 30 per cent. of the total water borne foreign freight movement for the year. Vessels of this type made 18 per cent. of the entrances and clearances in the overseas trade and carried 23 per cent. of the cargo. In the nearby ocean trade they made 16 per cent. of the entrances and clearances and carried 56 per cent. of the cargo, and in the Great Lakes trade they made about ¾ of 1 per cent. of the entrances and clearances and carried about 1 per cent. of the tanker cargo tonnage.

Sailing vessels engaged in our foreign trade made about 2 per cent. of the total entrances and clearances in 1930 and carried 669,000 tons of freight, or less than 1 per cent. of the total movement. In the overseas trade sailing vessels made only about 3/10 of 1 per cent. of the entrances and clearances, carrying 86,000 tons of cargo or less than 2/10 of 1 per cent. of the overseas cargo movement. In the nearby ocean trade sailing vessels made about 4 per cent. of the entrances and clearances and carried 345,200 tons, or a little more than 1 per cent. of the cargo transported, and in the Great Lakes trade they made about 1¼ per cent. of the entrances and clearances and carried 238,000 tons of freight, or about 1½ per cent. of the total Great Lakes movement.

Pacific Coast Share.

The substantial part taken by the Pacific Coast in the development of the American merchant marine is evidenced by the fact that Pacific Coast interests have established 31 American flag lines in foreign and noncontiguous trades. These 31 lines operate 261 vessels of 1,600,000 gross tons. They are employed in services calling at 29 domestic ports and 277 foreign ports located in 61 countries, territories, and islands. In addition to the vessels already employed, Pacific Coast companies are building under mail contract requirements nine vessels of nearly 140,000 gross tons and others are contemplated.

The experience of the United States in the last ten years clearly demonstrates the intimate relation between shipping and foreign trade. Since we have established permanent services in essential trade routes our commerce has expanded more rapidly than in any similar period in our history. Our country as a whole has benefited by this expansion but its results are particularly noticeable on the Pacific Coast. In the ten-year period 1921-1930 the water-borne foreign trade of the Pacific Coast has increased more than 157 per cent., while during the same period the water-borne foreign trade of the entire nation has advanced less than 19 per cent. This means that in a total increase during the ten year period of 19 per cent., the Pacific Coast contributed 11 per cent. In this connection, too, it should be noted that while the Pacific Coast handled 7 per cent. of our water-borne foreign commerce in 1921, in 1930 more than 15¼ per cent. of all water-borne foreign trade of the United States passed through Pacific Coast ports.

A resume of the import cargo tonnage handled by Pacific Coast ports during the decade 1921-1930 proves that while the total import tonnage arriving in the United States increased a total of 43 per cent., the import tonnage arriving at Pacific Coast ports advanced from 1,340,000 tons in 1921 to 2,900,000 tons in 1930—an increase of over 116 per cent.

A survey of the export traffic of the Pacific Coast is even more impressive for in the decade 1921-1930, the export tonnage handled by Pacific Coast ports advanced from 4,400,000 tons to nearly 12,000,000 tons, or 170 per cent.

Our experience in developing routes and services has demonstrated the need for modern ships to fit the trend of today, and we in America are meeting that need by building new tonnage and modernizing existing tonnage with the result that 18 new vessels have been completed and 23 are under construction, aggregating nearly one-half million gross tons. In addition, orders have been placed for 19 vessels of 157,000 gross tons for reconstruction and modernization, of which 13 have been completed and six are being rebuilt at this time.

To carry on and gain the fruits of our work and industry one other factor is necessary. It is the most vital one of all.

To insure the permanence and develop to greater degree our present merchant marine our exporters, importers, and the traveling public must be liberal in patronage and support of their own ships.

Trade, shipping and national defense are so closely interrelated that they cannot be separated. Shipping is the dominant factor among these three. The principal maritime nations are cognizant of that fact and have, accordingly, built and are building ships to strengthen this trinity.

America must keep pace with the maritime nations of the world by maintaining a relatively strong merchant marine to insure the perpetuity of its economic and political life.

Abstract of an Address before the Eighth Annual Pacific Coast Foreign Trade Convention at Oakland, California, September 17-18, 1931.

New Dollar liner President Hoover transiting Miraflores Locks, Panama Canal, to take her maiden dip in Pacific Waters.

Pacific Coast

Products in World Trade

Some International News Affecting Exporters

MANY Pacific Coast products are contacting world-wide markets and many of those markets are subject to constant change in tariff regulation, in credit situation, and in local demand. While it is impractical in a monthly periodical to record all of these changes, it is frequently of advantage to review the principal trends. Here are a few gathered from correspondence and from recent United States and other government publications.

Douglas Fir Maintains Its Position.—Douglas fir has succeeded in maintaining its position as one of the most important commercial timbers now being used in the South Africa Union. A small recession in imports from the United States was largely counterbalanced by an increase from Canada. This shifting of the trade has doubtless been caused by the creation of a direct shipping connection between the Pacific Northwest and South Africa, and the fact that Canadian lumber is allowed free entry while that from the United States must pay a duty of 3 per cent. ad valorem. The good texture of Douglas fir allows its utilization for interior trim and general woodworking of all types, while its large dimensions have made it invaluable for heavy construction work. There seems to be no indication that North European lumber can hope to compete with this species—the reverse actually being true, as Douglas fir is slowly but steadily being introduced to take the place of North European lumber whenever considerations of price and quality permit.

Shipments of Douglas Fir to 15 Leading Markets.—The increased European demand for Douglas fir, evident last year, as a consequence of competitive prices affording the opportunity to obtain quality lumber cheaply, has this year been greatly curtailed by the general dullness of industry requirements for this class of material. China and Japan, on the contrary, have lately shown some very slight indications of improvement—an appearance which the smallness of China's 1930 purchases rather over accentuates in the Douglas fir export figures. Such small and uncertain encouragement, however, as is yet evident from the rest of the world, is a development of the past 10 or 12 weeks only, and is not reflected in the figures, given below, of exports to the 15 chief 1931 markets for the six months. The total six months' 1931 export was 28 per cent. less than for January-June of 1930, and 44 per cent. under that for the 1929 period.

United States exports of Douglas fir to 15 leading markets (lumber, sawn timber, and logs), first six months

[M feet]

Country of destination	1930	1931	Country of destination	1930	1931
Japan and Kwantung	194, 644	172, 014	Germany	14, 676	4, 838
China and Hong Kong	93, 298	120, 220	France	16, 288	4, 292
United Kingdom	75, 820	52, 619	Chile	15, 256	3, 274
Netherlands	26, 050	13, 960	Mozambique and British South Africa	7, 128	2, 523
Peru	32, 147	11, 484	Panama	10, 308	2, 151
Argentina and Uruguay	20, 927	11, 907	Other countries	35, 006	13, 928
Mexico	18, 029	6, 800			
Australia	32, 026	6, 259	Total	611, 703	437, 439
Belgium	15, 433	5, 704			
Canada	4, 667	5, 466			

General Import Tariff for Malay States.—An official memorandum presented to the rulers of the Federated Malay States by the High Commissioner states that it is almost certain that it will be necessary to establish a general import tariff system in order to maintain a stable revenue, since the present sources are inadequate. At the present time the only articles subject to import duty are tobacco and tobacco products, liquors, wines and beverages, matches, cartridges, sugar, kerosene, and gasoline. All other imports are duty free.

Argentine Importation of Cottonseed Permitted.—An Argentine decree dated July 4, 1931, permits the importation of cottonseed into Argentina, which had been prohibited since May 8, 1906. However, only cottonseed guaranteed as to soundness and freedom from disease is permitted entry. The seed must be clean, without linter, and free of adhering fibers. The only containers permitted are completely soldered metal containers.

Uruguay Prohibits Imports.—For the declared purpose of improving the financial and economic situation in Uruguay, the government has passed an emergency measure, which was promulgated on August 20, 1931, prohibiting for one month the importation of a wide range of products, including certain so-called luxury and nonessential commodities. It is expected that the National Council will continue this measure from month to month for at least a year.

The list of products prohibited importation includes dairy products, fruit in syrup, preserves, canned beans and peas, beverage syrups, tomato paste and sauces, wood manufactures, paper and paper products, and cottonseed and coconut oils. This law applies to all goods purchased after August 7, 1931, it is subject to modification by the National Council, and also empowers that body to restrict the importation of nonprohibited goods to 70 per cent. of the volume of 1930 imports.

Uruguay has also increased the internal tax on gasoline and lubricants.

During the first six months of 1931 the raw cotton exports from the United States to the Orient increased 17 per cent. as compared with the same period of 1930. During the same period the Orient and Australasia absorbed 20 per cent. of the United States exports of refined mineral oils, which was a loss of 33 per cent. compared with 1930.

Australia has raised her tariffs on imports of box shooks and lumber for box making by approximately 14 per cent. This took effect July 20, 1931.

Imports of Food Products for India.—Imported food products enjoy a large sale in India. These include canned fish, fruit, and vegetables; cheese and butter; cocoa and chocolate; confectionery lard, bacon, hams; jams and jellies. American food exporters do a large share in this foodstuffs trade at Bombay. They could do a much larger trade with a little more study of the possible markets and more adaptation of their products and packing to suit the requirements of the trade.

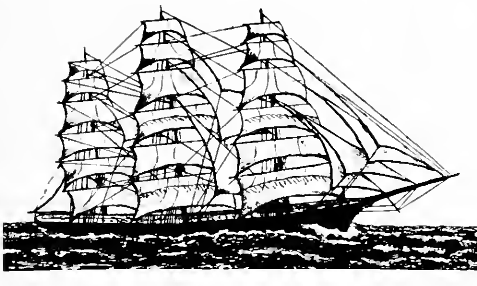
Grains, vegetables, and fruits are the principal items of diet. The demand for American or European food products is confined to European and American residents, Parsees, and the wealthier classes of the native population. The combined number of these groups is probably close to 10,000,000, with a very high average purchase power. The market is well worth a special effort for its further development.

New Zealand Dumping Duties.—By recent legislation, the Minister of Customs may, without previous notification, impose a dumping duty on any imports, the entry of which would in his opinion be injurious to New Zealand industries. The criteria upon which he is to base opinion are three; namely, if the actual selling price to the importer is less than the current domestic value; if the selling price is less than cost of production, plus a reasonable profit; or if special concessions which might be injurious to New Zealand have been granted by the exporting country.

Lost Romance of the Sea

Verse and Sketches

By Emil Francke



Queen of the Sea! thou wert—advance of modern days—renamed thee: "Barge No. 2"—
Dismantled and dilapidated, beyond mere words—now black with dust of coal.
'Though sound of timber, no more the graceful sheer renown'd in clipper-days—long past!
In view of thee—a vision comes to mind which fancies thy former self—a Whole!

Deeply laden, a finely sheered black painted hull with pyramids of dazzling canvas—
On lofty and staunch masts, broad, trimly spars, their gleam resplendent in the morning sun,
With lower yards just lifted clear of shrouds—the uppers proportionately braced in,
A spanking breeze—what magic rhythm—send thee through scudding on thy record run?

A perfect ship in all its details: "Sheets home alike on every sail —halyards well stretched—
The weather braces taut;" slight heel to starboard from loft's pressure by the wind's sheer force,
While over weather bow and waist in quick succession brilliant sprays were dashing,
Creating in bright sunshine, rainbow hues which glorified thy steady speed and course!

How white thy towering canvas did appear in contrast to the azure-blue—above!
Thy wet, black hull, still darker in a deep blue ocean, strewn with rolling caps of white,
Such charm, such grace was not excelled, in view of those aboard and those thou speed'ly pass'd
Leaving behind that milky and straight wake by day—phosphorently illumined at night!

Just then thou logged fifteen knots the hour, as dead ahead gray smoke appeared—
And those who strut thy scrupulously clean decks, in eager pursuit of the gamely-sight,
Did strain their eyes and marking time, with justly pride regaled in constant—rapid gain—
The British tramp abeam! belching forth dense clouds of smoke as if in shame its name to hide!

Queen passed to leeward, with exchange of colors, left the tramp clear out of sight 'ere dark,
While on she raced, now "Phantom Ship of Night"! Under a brilliant starlit dome—sublime!
The Southern Cross above her, Jupiter rising in the East, North-Star in its reign—afar—
LOST ROMANCE OF THE SEA! But memoirs of swift sailing ships that were—no more in our time!

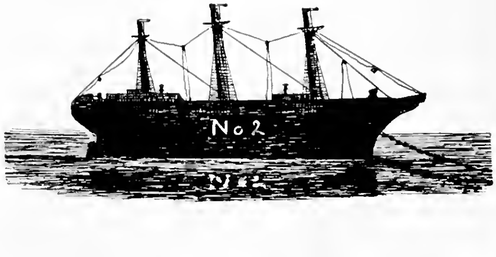
Almost human they appeared, 'though mute but docile ever to their Masters' call
In the maneuver, either go about when fair, or tack in weather foul with savage sea.
Gallant skippers, mates, and crews, alert of mind, agile in brawn and sinew—real sailor-men—
Pressing their charge beyond endurance often, when near land watching—in suspense the lee!

And then—while off Cape Horn and going West, held back by fury of South Western Gales,
Under main lower top sail with heavy sea's the decks awash and speed retarded to a mile,
Harassed by violent hailsqualls, frozen gear and rigging, they pitch'd and labor'd heavy!
A sudden change, the wind in favor, sails were unfurled, headway resumed in clipper style!

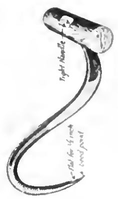
Let it be said, in tribute to the men of Maine, Massachusetts, Rhode Island and
Those other states, where such ships found the cradle of their birth, where men were raised—
To man them creditably, who's fame for mettle and resourcefulness was unsurpassed,
Who modestly met triumph—and—never knew to shirk, when them disaster faced!

A rudder lost—provisionally replaced, sails blown to bits—made new on board,
Spars carried away—newly shaped from spares, dismasted—some jury-rig set up aright—
Then proudly brought their sadly damaged charge, nine times in ten, to port of refuge or
Through to destination, with long or short delay and the laconic message—home: "Arrived"!

Progression did replace those ships by steam propulsion or combustion engine drive,
Sail now—in memory only lives—but history kept record of those days of—yore
With noble, stalwart sailing ships, the pioneers of commerce—winged messengers of peace!
Of a wide world—its elements and oceans their field of action,—THEN ROMANCE—now no more!



Proposed Minimum Safety Standards



For Cargo Handling Spaces, Gear, and Equipment in New Ship Construction, as Drafted by the San Francisco Port Advisory Safety Rules Committee and Submitted by the San Francisco Maritime Associations General Safety Committee

THE Safety work started by the Accident Prevention Department of the San Francisco Maritime Associations has, during the past five years, spread to every port on the Pacific Coast and has attracted world-wide notice by its commercial and humanitarian success. Very early in this effort there was recognition of the need for setting standards as to safe working conditions, safe rig and equipment, safe construction. At the same time it was realized that to go after the establishment of such safety standards in existing ships would in many cases entail reconstruction and replacements whose cost would be prohibitive. The first move, therefore, was to promulgate "The Pacific Coast Safety Code for Stevedoring Operations Aboard Ship (the Gray Book)," which was issued August 2, 1929.

It was agreed however, that if certain reasonable standards of safety for cargo-handling spaces and gear were developed they could be installed in ships to be built in the future, without additional cost.

Accordingly, the following committee, composed of operating executives, technicians, safety engineers, and other advisors, met in San Francisco at frequent intervals over a two year period with Deputy Commissioner W. H. Pillsbury of the United States Employees' Compensation Commission as chairman. Mr. Pillsbury resigned as chairman late in 1930 and was succeeded by Captain N. J. Kane.

J. B. Bryan, President, Longshoremen's Association of San Francisco Bay;

Jas. Bullock, superintending engineer, Dollar Steamship Lines;

S. C. Davis, Assistant Safety Engineer, Accident Prevention Department;

Captain F. M. Edwards, Assistant Manager of Operations, Matson Navigation Company;

C. H. Fry, superintendent of safety, California State Industrial Accident Commission;

F. C. Gregory, safety engineer, United States Employees' Compensation Commission;

Captain Charles Hansen, port captain, Pacific Steamship Company;

E. H. Harms, assistant to operating manager, McCormick Steamship Corporation;

Captain A. T. Hunter, operating manager, General Steamship Corporation;

Captain N. J. Kane, marine superintendent, American-Hawaiian Steamship Company;

George Kimball, electrical engineer, California State Industrial Accident Commission;

Captain J. G. Ludlow, manager, California Stevedoring & Ballast Company;

Captain J. F. Nichols, marine superintendent, Sudden & Christenson;

Captain W. J. Petersen, manager, Waterfront Employers' Union;

W. H. Pillsbury, deputy commissioner, United States Employees' Compensation Commission;

Captain Tom Smith, port captain, United Fruit Company;

A. E. Stow, Assistant to the operating manager, American-Hawaiian Steamship Company;

J. W. Thompson, employment manager, Bethlehem Shipbuilding Corporation;

B. O. Pickard, safety engineer in charge, Accident Prevention Department.

The work was divided into sections and assigned to sub-committees. The reports of these sub-committees were carefully gone over by the main committee and only such standards as were agreed upon are incorporated in this final draft.

It has been kept in mind that the minimum stanards adopted as the "Gray Book" should control, and also that under Rule 201 of said "Gray Book" the vessel, its owner, master, and officer in charge should accept certain responsibilities for providing safe working places for all operations.

The following minimum safety standards for cargo-handling spaces and gear apply only to new ships now under construction or to be built in the future. They are offered to all steamship companies for voluntary adoption, it being expressly understood that any device or standard herein recommended is, as implied, merely a "minimum" standard, and any device or condition providing equivalent or better protection or efficiency shall be acceptable as a substitute. It is recognized also that all requirements of the society or societies, in which the vessel is classed, and/or the United States Steamboat Inspection Service must, if conflicting, necessarily supersede any standards recommended herein.

SECTION 1—DEFINITIONS

See Rules 101 to 141, inclusive, in Gray Book.

(By "Gray Book" is meant Pacific Coast Marine Safety Code—Stevedoring Operations on Board Ship, adopted and approved by Pacific Coast, American Steamship, and Waterfront Employers' Associations on August 2, 1929.)

SECTION 2—HATCH COVERINGS

Rule 1. Wooden hatch covers shall be considered satisfactory on account of the present cost of steel coverings and lack of any satisfactory metal covers.

Rule 2. Hatch covers for all hatches in any one hatchway shall be interchangeable with a standard width of 21 to 23 inches according to width of hatch; hence for any one hatchway the beams shall be equally spaced. Beams shall have a flange of width of at least 4 inches for supporting the hatch covers.

Rule 3. When hatch covers are made of two boards, these shall be fastened by tie-rods riveted to prevent spreading. Hatch hand-holds shall be independent of the tie-rods and shall be placed far enough from the end so as not to weaken the board, but such distance shall not exceed 12 inches. The hand-grips shall be set off-center and the hole shall be large enough to freely admit the hand.

Note: The following method for construction of double hatch covers is suggested:

Stock to be not less than 3 inches thick, sized both sides, fastened together with $\frac{1}{2}$-inch iron tie-rods placed 6 inches from the ends of the cover, and one or more in the center of the cover if required; rods to be fitted with washers and riveted on both ends; ends of covers to be strapped with a strip of No. 22 gauge galvanized iron 4 inches wide starting 1 inch from the end of the cover; hand-holes $4\frac{1}{2}$ inches in diameter by $1\frac{3}{4}$ inches deep, placed not less than 10 inches and not more than 12 inches center from the end of the cover, and fitted with a hand-grip of $\frac{5}{16}$x$1\frac{1}{4}$x7-inch galvanized half-round iron, to be placed with flat service flush with and parallel to surface of hatch cover, and secured by two $\frac{5}{16}$x$2\frac{1}{2}$-inch tire bolts counter-sunk and riveted; one hand-hold to be placed in each cover at opposite ends and sides.

Rule 4. See also Gray Book Rules 608 and 609.

SECTION 3—HATCH BEAMS OR STRONGBACKS

Rule 1. Hatch beams or strongbacks should be equipped with sliding bolts (with a positive locking device) horizontally parallel to them, or equivalent, so that beams may be secured to coamings when hatch is being worked in sections. (See also Gray Book Rule 501.)

Rule 2. Hatch beams or strongbacks shall have a flange or width of at least 4 inches for supporting the hatch covers.

Rule 3. For any one hatchway the beams shall be equally spaced.

Rule 4. See also Gray Book Rule 601.

SECTION 4—HATCH COAMINGS

Rule 1. Hatch coamings on main or top decks should extend at least 3 feet above the deck.

Rule 2. Tween deck hatch coamings should be as low as classification requirements permit.

SECTION 5—GUARDING TWEEN DECK HATCHES

Rule 1. Tween deck hatch coamings should be equipped with sockets and stanchions so that safety lines may be stretched around hatch openings while or when hatch covers are off and no cargo is being worked.

SECTION 6—CLEATS AND RING BOLTS

Rule 1. There should be a sufficient number of cleats and ring bolts on deck at side of vessel to properly secure boom guys at all times when vessel is using cargo booms.

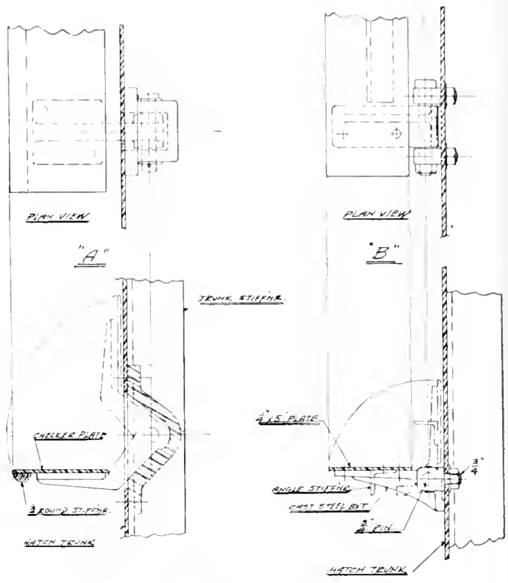
Rule 2. See also Gray Book Rules 514 and 602.

SECTION 7—CARGO BOOMS

Rule 1. Cargo booms should be of such length that when cargo is being worked across the deck excessive strains on booms, guys, falls, etc., will be avoided.

Rule 2. Cargo booms should be tested and have the approved safe working load plainly marked in a conspicuous manner and place, preferably at the heel of the boom. (See also Gray Book Rule 605.)

Rule 3. All places where wire topping lifts of cargo booms are made fast, such as masts, samson posts, etc., should be provided with two cleats, or equivalent,



SKETCH SHOWING GENERAL CONSTRUCTION OF TWO SUGGESTIONS FOR HINGED WALKWAYS IN HATCH TRUNKS

at least 3 feet apart for this purpose. (See also Gray Book Rule 604.)

Rule 4. Lead blocks at the heel of cargo boom should be adjustable to prevent block from sagging.

Note: See also American Marine Standards' Approvals, No. 26 (June 10, 1927) and No. 50 (February 8, 1929) for Tubular Steel-Cargo Booms for Ships and Fittings for Same.

SECTION 8—WINCHES

Rule 1. All winch controls should be so placed that winchmen may have a clear view of hatchway without resorting to makeshift handles. (See also Gray Book Rules 422, 424 and 425.)

Rule 2. When vessels are constructed for a trade which generally requires the carrying of deck loads, (a) winches should be located upon platforms elevated to at least the height of the maximum deck load allowable or (b) elevated platforms for winch drivers should be provided, and all control levers and the stem of the valve in the steam line should be properly extended to this platform.

Rule 3. There should be a sufficient clear spacing between winches and hatch coamings to allow men free access to hatch ladders.

Rule 4. All winches should be provided with necessary guards in compliance with Gray Book Rules 301 to 306, inclusive.

Rule 5. All exhaust steam from winches should be led back to condenser or funnel. See Rule 515, Gray Book.

Rule 6. All steam lines should be guarded against possible contact in an adequate manner.

Rule 7. See also Gray Book Rule 513.

SECTION 9—ACCESS TO HOLDS

Rule 1. Through Hatches in all Ships carrying General Cargo:

(a) Ladders shall be permanently placed and secured in the open hatchway and be straight, vertical, and continuous from the top of coaming to bottom of hold; each hatch in excess of 15 feet in length shall be equipped with two ladders on opposite sides or ends of hatchway.

(b) Such ladders shall be constructed as follows: Side runners to be 3x6-inch angle iron, with the rungs fastened near the edge of the 6-inch leg of the angle, and the 3-inch legs to be turned in behind the ladder to prevent cargo crowding too close to rungs; and that rungs be of flat steel bars not less than 1½ inches wide by 3/8 inch thick, and not less than 14 inches long.

(c) When ladders terminate upon the shaft tunnel, short ladders of standard construction shall extend from the top of the shaft tunnel to the bottom of the hold.

Rule 2. Through Trunked Hatches:

(a) Where a hatch is trunked, two steel ladders of the above standard construction shall be placed in diagonally opposite corners and shall be enclosed in steel trunks of lattice construction. The sides of these lattice enclosures should be approximately 2 feet by 2 feet 3 inches and they should extend from the top to the bottom of the trunked portion; suitable vertical angles should be fitted at the corners with ½x3-inch horizontal bars, spaced about 2 feet apart and riveted to the corner angles; extra wide bars should be fitted at the upper and lower ends of the enclosure to give vertical strength. The two open sides of the lattice enclosure should be covered with ½x2½-inch steel bars fitted vertically and spaced about 6 inches centers.

(b) From the bottom of the hatch trunk to the tank top in way of lower hold the ladder is to be of standard construction and may be bolted in position for easy removal. This portion of the ladder is to be guarded on one side by a similar steel lattice, which will be removable.

Rule 3. Specially Constructed Hatches for Bulk Cargo:

Access to each hold specially constructed for bulk cargo, unless furnished with ladders of types (a) or (b) above, shall be through 14x18-inch man-holes on each side of the hatch and through each deck from the weather deck to the lower deck and shall be straight, vertical, and continuous and fitting a steel trunk approximately 24 inches square around the man-holes and carried from deck to deck. This trunk is to be enclosed on three sides but will be left open on the hatch side; to be made of ¼-inch plate with 2½x2½x5/16-inch corner angles, upper and lower ends to be riveted to deck with suitable angles. A steel ladder of the above standard construction is to be secured to outboard wall of each access trunk. The man-holes on each deck are to be fitted with a raised steel coaming riveted to deck and made water-tight and provided with a hinge steel cover or door which will have a heavy eye and hasp for padlock, and, in addition, the manhole doors on weather deck are to be provided with rubber gasket and suitable dogs for water-tightness.

Rule 4. The Bullock "Cat-walk" for Removing Strongbacks in Trunked Hatchways:

It is recommended that hinged walkways be fitted around the inside of hatch trunk at deck level, also that a continuous handrail made of ½-inch galvanized wire rope rove through heavy steel eyes spaced about three feet apart be fitted. Handrail to be placed about 38 inches above walkway. The handgrip is to consist of 5/8-inch galvanized iron wire cable secured to hatch trunk with suitable eye bolts, turn buckles, etc. Each hinged section will be made up of ¼x5-inch plate, and fitted with a piece of 1½x1½x¼-inch angle iron on under side of stiffening. There will also be a cast steel hinge at each end so fitted in recess as to support walkway when in horizontal position. Hinges to be riveted to plate and bolted through trunk casing. The bulkhead in way of hinges to be recessed for the stowage of walkway brackets when not in use. When not in use, these platforms are to be swung up in a vertical position and held so by means of a cast steel latch placed at upper edge of plate. Each section to have one latch fitting.

Rule 5. See also Gray Book Rules 419, 420 and 421.

SECTION 10—ILLUMINATION OF DECKS, HOLDS, AND CARGO-HANDLING GEAR ALOFT

Rule 1. For hold and tween deck lighting portable units of a type equivalent to the Kane Cargo Light (described later) should be used; outlets for plugging in the portable units are to be provided in each end of the coamings at all tween decks.

Rule 2. For side port tween decks it is recommended that a combination of permanent and portable fixtures be installed. The permanent fixtures should be so spaced overhead as to avoid shadows and each bulb should not be less than 100 watt capacity inside-frosted globe in suitable reflector of the R L M dome or angle type. These should be supplemented in special working places and near side port entrances by the Kane Cargo Light.

Rule 3. For deck lighting permanent fixtures be placed on samson posts and masts with proper reflectors to illuminate all deck cargo-handling machinery and gear, and all deck spaces between hatch coaming and the rail over which the cargo hook is passed.

Rule 4. For gear aloft it is recommended that either lights of a portable type with proper reflectors equivalent to the Kane Cargo Light or floodlights be so placed on the starboard and port sides of the housing, both forward and aft, to illuminate all blocks, shackles, falls, topping-lifts, and other gear which is being used in cargo-handling operations. It is particularly important that all gear at the end of the booms should be visible to the winch driver.

Rule 5. Illumination Intensity: (a) For decks and holds the minimum intensity of illumination should be two foot-candles.

(b) For Gear aloft, the minimum intensity of illumination should be one-half foot-candle.

(c) For Tween Decks worked through Side Ports, the minimum intensity of illumination should be three foot-candles.

Note: Light intensity is expressed in foot-candles. One foot-candle is the intensity of illumination produced at a point on a surface, one foot distant from the light source of one candle power, the surface being at right angles to the light rays.

Rule 6.—Color of Paint in Holds: It is recommended that a light CREAM be adopted as a standard color for painting the holds of ships and other surfaces where re-reflecting of light is required.

Rule 7. Portable Lights: (a) The Kane Cargo Light before mentioned as the recommended minimum standard portable light consists of a standard Benjamin (No. 5543) commercial reflector, fitted with a special shock-absorbing lamp socket, and mounted upon a special ball and socket bracket which permits the light to be directed and held in any desired direction with a minimum of effort. The bracket is built to fit in an inexpensive cast steel socket of about 4" x 4" over all dimensions, capable of being riveted, welded or otherwise permanently or temporarily secured to hatch, ladders, coamings, beams, stanchions, rails, or similar places. The ball and socket tension is automatic which, when the bracket is placed in a socket makes it possible to turn the light in any direction or plane by use of one hand only. The reflector is of the symmetrical angle type, 12″ in diameter having a spread of approximately 65 degrees. The bulb used is of the Mogul type, which will not fit ordinary electric lighting sockets. The entire assembly is light and easily carried and or set in bracket socket with one hand. It is so constructed that it will withstand rough handling.

(b) Two of the Kane Cargo Lights should be provided for each hatchway and a sufficient number of bracket sockets should be placed in convenient places at the hatch coamings and other convenient places in each tween deck. In order to minimize glare it is recommended that white bowl lamps be used; only lamp units of 300 watt capacity be used; and that the reflectors be maintained in a clean and polished condition.

Rule 8.—Permanent Fixtures: The permanent fixtures recommended for samson posts and masts should be of the type that are now commonly used aboard ships except that all lamps should be from 300 to 500 watt capacity fitted with special shock-absorbing socket. They shall be fitted with suitable guards and a reflector of the R L M dome or angle types or equivalent, the shape of the reflector depending on the positions of the samson posts or masts with relation to the area to be illuminated.

Rule 9. Vapor Proof Units: Where lighting equipment may be exposed to the weather or to an accumulation of explosive vapor that may escape or be released from cargo, it is of utmost importance that vapor proof equipment be installed.

SECTION 11—WIRING, OUTLETS, SWITCHES, CONDUCTORS, and FITTINGS, WITH SPECIAL REFERENCE TO CARGO SPACES

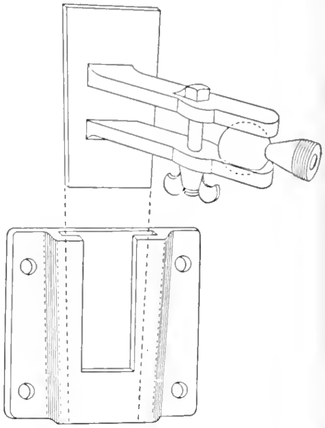
Rule 1. Wiring: (a) All wiring is to be installed with Underwriters' approved rubber covered conductors of the required carrying capacity as shown in National Electrical Code Rule 612.

(b) The conductors of all wiring systems in damp or wet places or where subject to deteriorating agencies (such as sulphuric acid flumes and cocoanut oils-, or where exposed to inflammable gases or inflammable dust (such as gasoline vapor or any dry highly carbonaceous dust or other explosive or inflammable dusts or cargoes), or where exposed to rain or sea water, shall be leaded and installed in conduit, or approved marine type armored cable usually referred to as lead and armored cable. The entire conduit system in such locations is to be made water-tight and be equipped with approved moisture proof and vapor proof fittings.

(c) Wiring in dry locations or where none of the above hazards exist may be of approved rubber covered, braided insulation installed in conduit, or approved marine type armoured cable usually referred to as lead and armored cable.

(d) All underground conductors shall be protected from overload by approved automatic cutouts as required by the National Electrical Code.

(e) Splices in wiring shall be avoided as far as possible and when necessary they shall be made at junction boxes, outlets or other fittings. The splices, taps, or joints shall be made electrically and mechanically secure and then be soldered and insulated as required for conductors in that location.



Kane fixture for supporting cargo lights in holds on stanchions.

(f) Portable cords and cables shall be of the approved heavy duty type (Underwriters' "Type S" or equivalent) and shall be securely fastened into fittings, plugs or receptacles so that no strain will be brought on the terminals or connections.

Note: It is recommended that due to the rough handling and severe service to which portable cords or cables may be subjected, that no cord be used smaller than No. 14 A. W. G.

Rule 2. Outlets: Approved marine type outlets shall be provided at all conduit or cable junctions or terminals and at all locations where lamps, switches, plug receptacles or other devices are to be connected. They shall be of sufficient size to stow away splices and connections without crowding the conductors. Outlet boxes in cargo spaces, or where exposed to weather shall be water-tight. Outlet boxes shall be in readily accessible places.

Rule 3. Switches and Fuses: (a) All switches shall be of the approved enclosed externally operated type. In switches of the fused type the fuses shall be on the load side of the switch so that they will be disconnected from the source of supply when the switch is opened. Fuses shall be of the size required to protect the conductors of the circuit they supply. Switches and fuses shall be located in safely and readily accessible locations where the switch handle or the fuses will be not more than $6\frac{1}{2}$ feet above the floor, deck, or permanent platform.

(b) Switches and fuse cabinets in wet locations or where exposed to the weather shall be of weather proof or water-tight construction.

(c) Switches and fuses shall not be located where explosive gases, vapors, dusts or flyings may be present in dangerous quantities except as provided in paragraph (d).

(d) Switches and cutouts having all parts, which may arc or spark, submerged in oil, may be used in places where explosive gases, vapors or flyings are present, if it is impracticable or impossible to locate them elsewhere. Such equipment should not be permitted except where the equipment will be under competent maintenance and supervision.

Rule 4. Conductors: (a) All wiring conductors shall be of Underwriters' approved rubber covered and braided type and of liberal capacity for the circuit in which they are to be used. They shall be protected from overload, short circuits or grounds by approved cutouts.

(b) Conductors used where the wiring system may be exposed to water, excessive moisture, condensation, oily vapors or other disintegrating agencies, shall be leaded in addition to being enclosed in water-tight conduit, or shall be lead and armored cable. Either (conduit or cable) shall have approved marine fittings.

(c) Care should be exercised to install armored cable without kinking, flattening or otherwise deforming it.

Rule 5. Conduit and Fittings: (a) Where conduit is used it shall be of approved type sherardized or galvanized to resist corrosion. Conduit system in wet places or where exposed to corrosive fumes, vapors, or steam shall be made water-tight. Threaded marine type boxes and fittings shall be used and the threads shall be carefully leaded before connecting. Approved tools should be used which will not break the protective coating on the conduit and the entire conduit system with its outlet boxes, junction boxes and fittings unless of composition shall be carefully painted with at least two coats of good protective paint. The conduit system should be regularly inspected and be maintained in good condition. In locations where there will be condensation, or water may be trapped, the conduit or outlet boxes shall be provided with drains at the lowest points of the conduit system where the moisture may be trapped.

(b) Fittings shall be of the approved marine type having threaded connections. Fittings using ordinary lock-nuts and bushings shall not be approved for marine work in any location where moisture, deteriorating agencies, or explosive gases or vapors are present or liable to be present.

(c) The conduit system shall be mechanically secured in position in a firm and substantial manner independent of the support afforded by boxes, cabinets or fittings. As a general rule, the distance between supports or fastenings should not exceed approximately 6 feet.

(d) The entire conduit system and/or the entire armored cable system shall be permanently and effectively grounded by being bonded to the steel hull of the ship or to a grounded water piping system.

(e) Where armored cable leads pass through water-tight bulkheads a water-tight stuffing tube capable of taking packing should be employed and through non-water-tight bulkheads, beams, etc., a lead bushing should be used or the holes otherwise prepared to permit drawing the cable without damage.

(f) Where cables pass through decks they are to be protected by a pipe extending 18 inches above the deck with a stuffing tube on the upper and rounded bushing on the lower end.

(g) All cables in bunkers, in way of cargo ports or hatches and tank tops where particularly liable to damage, should be specially protected as by metal coverings or angle irons.

(h) Fittings for armored cable shall be of approved design for use with the type of cable employed, and where exposed to moisture shall be water-tight.

Note: (A) The National Fire Protection Association's Regulations governing Marine Fire Hazards, 1930 edition, in their Appendix—B refer to the American Standard for Electrical Installation on Shipboard, now in course of preparation by a Sectional Committee of the American Engineering Standards Committee. This publication may now be ready for distribution. It is probable that it will cover some of the features of ship wiring in more detail than this report.

(B) Reference is also made to the American Institute of Electrical Engineers Standards "Recommended Practices for Electrical Installation on Shipboard", of October 1930.

(C) Reference is also made to the American Bureau of Shipping, "Rules for Building and Classing Steel Vessels".

SECTION 12—GREASING SYSTEM

Rule 1. An alemite or similar high pressure greasing system shall be provided for greasing cargo boom goosenecks; roller chocks; fair leads; blocks; hatch rollers; and similar equipment.

SECTION 13—TESTING

Rule 1. It was recommended that in actual tests or in re-tests, that equipment be subjected to not more than one and one-half times the maximum working load to be recommended.

Accident Prevention in Pacific Coast Ports

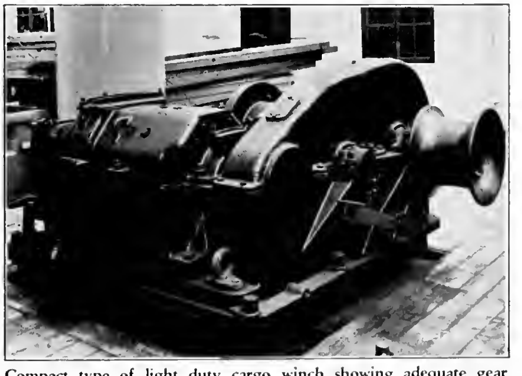
THE Accident Prevention Department of the Pacific American Steamship Association, through Byron O. Pickard, Safety Engineer in Charge, in its report for the first six months of 1931, states that, the major accident frequency rate, based on the number of accidents for each 10,000 longshore-hours worked in San Francisco Harbor was 22% less in the first six months of 1931 than it was for a similar period in 1930. In Los Angeles Harbor the frequency rate was 39% lower. In the Columbia River ports the frequency rate was lowered 15%.

This record is accomplished in spite of the fact that the 1930 rates were considerably lower than for 1929.

During the first six months of 1931, San Francisco Bay ports reported a total of 247 accidents resulting in lost-time injuries to longshoremen and one fatility. This was the first fatal injury to a San Francisco longshoreman in fourteen months, the former best record being nine months between fatal injuries.

Los Angeles Harbor reported a total of 197 accidents resulting in lost-time injuries to longshoremen and one fatality.

Columbia River ports reported a total of 237 accidents resulting in lost-time injuries to longshoremen and one fatality.


Compact type of light duty cargo winch showing adequate gear guards and good wiring practice.

New Sails for "Old Ironsides"

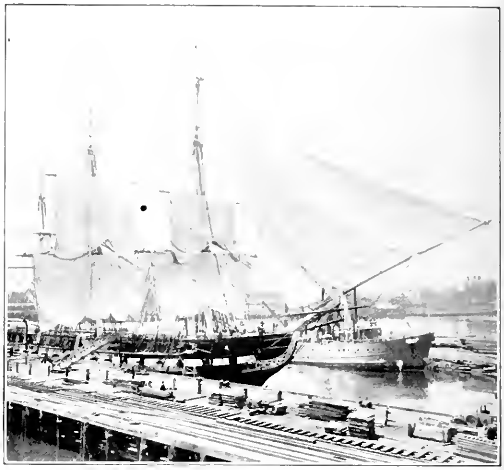
American Sail Makers Present a New Suit of Canvas to the Pride of the Old Navy

MANY hearts and hands made possible the reconstruction and reconditioning of "Old Ironsides," one of the most famous ships in American naval annals. When the "Save the Constitution" Committee undertook the gigantic task of finding ways and means to restore her exactly as she was a century ago, American firms who were in a position to lend a hand proudly did so. Their donations were supplemented by the school children of the nation who contributed their "pennies" to her reconstruction. One of the most important and spectacular contributions to U. S. Frigate Constitution's restoration was the donation by Wellington Sears Company of 12,500 square yards of white oceanic duck for her sails, costing approximately $7000.

The sails were woven by the West Point Manufacturing Company, West Point, Georgia, one of 18 associate companies. The fabric was converted into sails by sailmakers in various parts of the country, old at the game and skilled in their art, in accordance with a sail plan provided by the United States Navy Department. Nine different weights of duck were necessary for the Constitution's thirty sails, the heaviest weight being found in the main topsail, fore topsail, and foresail; the lightest in the main royal staysails.

It is interesting that a century of time has seen very little change in the sailmaker's loft. The new suit of sails for the Constitution was made under almost identical conditions and in almost identical fashion as was her first suit in 1797 when she was launched with all the upright bearing and dignity of the old Navy.

In the sailmaker's loft of C. R. Daniels, Inc., on Crosby Street in old New York, was fashioned the port main topmost studding sail for the gallant old frigate.



New sails being fitted to the U. S. frigate Constitution at the Brooklyn Navy Yard.

Sail makers in the loft of C. R. Daniels, Inc., New York, working on sail for U. S. frigate Constitution.

The assignment presented no special problem to men whose fathers and grandfathers before them had properly equipped square riggers to meet the winds. On the floor of the loft the pattern of the sail was mapped out and the cloth cut, a very critical operation. Every seam was stitched four times. Then back on the floor where it was trimmed and re-measured. No machine has ever been invented to replace the handwork of sewing on the metal rings and metal eyelets, and of stitching the heavy rope with sail twine around the outside of the completed sail. Exactly the right spread was given, every wrinkle taken out in the broadseaming, and the wind pocket perfectly aligned, so that the finished sail might be true.

With her suit of 30 new sails, the Constitution is again ready for any emergency. Her flag that has never been lowered in defeat again floats over the high seas on visits to many ports including Bar Harbor and Portland, Maine, Providence, Newport, New York, Newark, Wilmington, Philadelphia, Newport News, Norfolk, and Yorktown.

At the Yorktown Sesquicentennial in celebration of the surrender of Lord Cornwallis to General Washington, Old Ironsides will hold "open house" on Sunday, October 18, in the York River, along with visiting French and American warships. Fireworks will recall battle scenes over the York River, and in the center of international naval maneuvers the adventurous past of the famous ship will live in the present. Famous men will be there. President Hoover, General Pershing, and many governors have accepted the invitation of Gov.

Number of Yards of [illegible] Canvas Required in a Complete Suit of Sails
for the
U. S. Frigate CONSTITUTION

SAIL	No. of Canvas	#1	#2	#3	#4	#5	#6	#7	#8	#9 (1½" Cotton Canvas - Medium -)
Flying Jib	#5					[illegible]	[illegible]			
Jib	#3			[illegible]	[illegible]					
Fore topgal't.stays'l.	#4				108	30				
Fore topmast stays'l.	#4		376	57						
Foresail	#1	519	114							
Fore topsail	#1	550	189							
Fore topgallant	#5					268	63			
Fore Royal	#8								176	
Fore Trysail	#2		478	74						
Mainsail	#2		734	108						
Main topsail	#1	723	187							
Main topgallant	#5					298	106			
Main Royal	#8								171	
Main topmast stays'l.	#7							[illegible]	[illegible]	
Main topgallant stays'l.	[illegible]								[illegible]	
Main Royal stays'l.	[illegible]									200
Main Trysail	#2		[illegible]	74						
Mizzen topsail	#3			[illegible]	162					
Mizzen topgallant	#6						142	52		
Mizzen Royal	#8								18	
Mizzen topmast stays'l.	#7							131	18	
Mizzen topgallant stays'l.	#8								127	
Spanker	#2		446	78						
Mizzen gaff tops'l.	#7							308	37	
Fore studding sail	#7							718	54	
Fore topmast studding	#7							486	46	
Fore topgallant studding	#8								280	
Main studding sail	#7							768	60	
Main topmast studding	#7							704	60	
Main topgallant studding	#8								394	
Total number of yards		1812	2693	1024	287	[illegible]	363	3472	1930	200

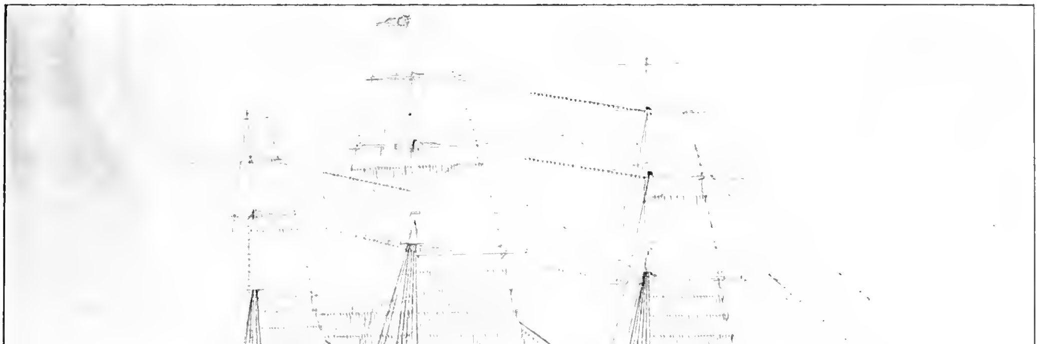
Total number of yards..........12,511.

A few of Uncle Sam's modern gobs learning how to furl sails on the yards of Old Ironsides. These boys are standing on ratlines 100 feet above the deck.

John Garland Pollard of Virginia to attend the festivities with their military staffs. Descendents of Lafayette, Rochambeau, and von Steuben are expected to be there.

This ship, beloved through the years by the nation which launched her embodies our highest naval traditions. Her history is filled with victories—as flagship to the Mediterranean fleet during the Tripoli Blockade she broke the power of the Barbary pirates, in 1812 she dealt a decisive blow to British supremacy of the seas in her memorable battle with the Guerriere, scoring some 19 additional victories before the war ended. On her decks many dignitaries were entertained. The names of some of our greatest sailors, Hull, Stewart, and Bainbridge are one with her name. Following her triumphs she sailed around the world on a good will tour of 495 days. In 1878 she made her last voyage to foreign waters, when she carried American exhibits to the Universal Exposition in Paris. She represented a young nation destined to become a world power, and the world paid her homage accordingly.

So it was with genuine grief that those who gathered in Boston to see her "take off" on her present exhibition cruise found her, with sails furled, at the end of a long tow rope. For some weeks before she was sched-



Complete original sail plan of U. S. frigate Constitution taken from a drawing traced at the Bureau of Construction and Repair, United States Navy, from the original drawings by Charles Ware dated 1817.

uled to leave controversy ran high following a statement made in error by Assistant Secretary of the Navy Jahncke that "the Constitution had only one or two sails for exhibition purposes." It was pointed out that she was fully equipped with sails, and immediately a new controversy was inaugurated as to whether or not able bodied American seamen could be found to sail a square rigger. The Navy Department was besieged with protests and offers. Finally Secretary of the Navy Adams promised that under favorable conditions on her cruise, Old Ironsides will spread her wings to the breeze. With this promise patriots were forced to rest their case.

The sailmakers, especially were disappointed to discover that the old ship was not to be navigated under her own power. Their disappointment was shared by the company through whose interest and generosity the sail cloth had been provided. And yet when she slid down the channel with whistles shrieking, on both sides of the harbor, airplanes circling overhead, and the Navy convoy following in her wake, even the indignity of a tug could not and did not dull her majesty.

With canvas for sailing ships in the spotlight of public opinion, attention is called to an interesting fact—that the modern liner and the modern battleship consume more duck than the old time sailing ship. Between 15,000 and 20,000 square yards are used for deck coverings, awnings, life boat and equipment covers, flue covers, paulins, and tarpaulins.

Thus American Cotton sails the high seas in many guises and in increasing quantities. Meanwhile the sailmaker plys his needle—to-day as yesterday, stitching sails to fulfill the demands of adventure and romance, of commerce and trade. And, engraved on a tablet mounted on the bulkhead just inside the captain's cabin on Old Ironsides, are listed for all time the names of those of their craft who manufactured her new suit of sails.

A Pioneer Pacific Coast Surveyor

Some of the Difficulties, Hardships, and Accomplishments of George Davidson in Establishing the Coast Survey in 1849

By R. R. Lukens

WHEN the discovery of gold in California electrified the world and started hundreds of ships for the Golden Gate, the United States Coast Survey had made no surveys whatever on the Pacific Coast. The demand for charts and hydrographic information suddenly became insistent, and in 1849 the Coast Survey sent the schooner Ewing to San Francisco to start hydrographic surveys.

Among the first chiefs of parties to be sent out was George Davidson, a sub-assistant of the service, who was then 25 years of age, with several years training in the work of the Survey, which by that time had become well organized and standardized on the Atlantic Coast. Orders were issued him leaving only six days to prepare for the undertaking, and Davidson and his party sailed from New York on May 4, 1850, on one of the new Aspinwall steamers. Thousands of men were clamoring for passage to the gold fields, and it was only through the influence of the Collector of the Port and other federal officials that Davidson was able to obtain accommodations for himself and his small party.

Davidson was allotted $9000.00 for a year's work on the Pacific Coast. This was to include the cost of the passages out, pay of officers and men, and all other expenses incurred by the party.

Superintendent Bache evidently realized that this amount was entirely too small, but there was no more available, and he felt that he must get men in the field and show results before he could obtain adequate appropriations from Congress. In a letter to Davidson, he says: "Do as much as you can for the amount, taking care to reserve enough to subsist your party to the end of the year. Your party has agreed on the faith of gentlemen to stay by you one year from the time of arriving, at the end of which they may come home or leave the service or continue as they desire. Do the best you can in the way of accommodations for them. Try to select healthy localities for camps."

After an uneventful voyage the party arrived at Aspinwall (now Colon) and had a busy time getting the instruments and baggage across the isthmus. The route was by pulling boats up the Chargres River, and thence by pack mules over a miserable road to Panama. Davidson carried his precious chronometer while Rockwell, his assistant, carried the barometer. They got them across safely, but several times both had to leap from their mules when the animals slipped and fell. From Panama he wrote "Several murders and robberies have taken place on the route from Cruces and persons now travel several together for mutual protection—these depredations are committed by Americans who have become penniless. So far the only danger is to those returning from California." In the same letter he advises officers following him to bring a supply of "franc pieces" as they were passing for the same as a "quarter."

The party sailed from Panama on the steamship "Tennessee" and arrived at San Francisco on June 20, 1850. On the voyage Davidson took daily temperature observations of the sea water and air.

Excitement at San Francisco

Upon arrival at San Francisco, Davidson found four or five hundred ships in the harbor with about 20 vessels arriving or leaving each day. "The excitement here," he wrote, "is such that it can not be imagined—it has no precedent and scarcely anything but actual experience will carry conviction. I shall go to Point Conception because that part of the coast is unknown and is said to be 20 miles in error in longitude. The difficulties in transportation there are great and I may get no aid from any source—so far I have failed—people are too anxious for fortunes to think of the survey. You wish me to furnish "wants"—I can do it by spending all the money as necessity demands, rapidly and in large quantities. California prices must be paid. I shall economise as much as possible, although the word is unknown here—it is all "ounces" and pounds and nothing below a dollar! To ascertain California prices, multiply Atlantic prices by 6 and 7 and a near approach may be made. I can not urge it too earnestly and I should consider it a want of duty and an injustice to myself were I not to declare that there is nothing but difficulty and defeat ahead at the present rate of appropriation. It needs no prophesy—it is palpable—the handwriting is on the wall!

"I shall not look back from the plough while the money lasts, but when it is gone, I must stand still."

Davidson's instructions from Washington were very broad and Supt. Bache left it to his judgment as to where he should start the work. At this time the coast of California was so badly charted that many shipmasters drew their own charts and others not familiar with the coast, kept far at sea and wasted much time bucking the persistent northwest winds. Davidson quickly decided that the first work should be that of determining the latitude and longitude of all the principal capes and headlands of the coast.

Longitude of Conception

Point Conception which he describes as the "Cape Horn of the Pacific," was selected as the start of the survey, and here Davidson began his distinguished work on the Pacific Coast which was to continue for 45 years.

The party left San Francisco on a small trading schooner July 7 and landed at Point Conception on July 12, 1850. They set up the observatory and camp at once and in a letter dated July 18 he writes, "Our cook is a Californian and well acquainted with this section of the country and knows all the "Rancheros" about here; in this respect he is of good service to us and so we put up with his dirt and primitive cooking (?). For the exercise of his peculiar genius we pay him $125.00 per month—more than all three of us get! (Davidson, Rockwell and Lawson). The people here seem well disposed to us and to be willing to aid us as far as their scant means will allow." In other letters he recites the impossibility of communicating with Santa Barbara and states that his efforts to engage the services of local inhabitants to go for mail and provisions were met with shrugs of the shoulders and their everlasting "quien sabe."

He was successful in his work here and by means of moon culminations and occultations, determined accurately the longitude of Point Conception. A small scheme of triangulation was executed, and the shore line of the vicinity was accurately mapped for the first time. When we compare Davidson's longitude of Point Conception with known value of today, we find him in error 1-1/5 minutes of arc, or a little less than 5 seconds in time, to the eastward.

At the end of the season, when his money had all but given out, Davidson and his party returned to San Francisco in a small dirty fishing smack.

Lighthouse Locations.

One of the important duties assigned Davidson and other Coast Survey officers on the coast was the selection of sites for lighthouses, and shortly after his return to San Francisco, Davidson planned an expedition to Monterey to determine the latitude and longitude of the locality and to select a site for a lighthouse. He and his party sailed in the Coast Survey schooner Ewing, but when 75 miles south of the Golden Gate they ran into a terrific gale which left the Ewing almost a wreck. Two of her three boats were washed away and her sails were torn into shreds. When the gale abated, it became calm and the schooner found herself drifting toward the bar on which a tremendous sea was breaking. She was brought up by dropping both anchors, and when a little wind sprang up new sails were bent and the best bower was hove in and the other with 45 fathoms of cable was slipped. She returned to San Francisco for repairs and Davidson made arrangements whereby Howland and Aspinwall agreed to land him and his equipment at Monterey from one of their Panama steamers.

This time the party reached Monterey, but their equipment was landed on the deck of a deserted schooner anchored in the bay. Hands were left on board to watch the property and that very night the schooner began to sink. The men gave the alarm and managed to attract people on shore. They got the only boat in town and succeeded in getting most of the stuff ashore—instruments first in accordance with Davidson's orders. When the schooner sank at 1 a.m. it carried with it a considerable amount of Davidson's private baggage.

He immediately selected a camping site and went ahead with his astronomical observations and made a topographical survey of the vicinity.

While Davidson and his associates on the Pacific Coast were struggling against great handicaps, Superintendent Bache was able to get more and more liberal appropriations for work on the Western Coast, and the survey began to make creditable headway.

For four years Davidson continued his work of determining the latitude and longitude of the various headlands along the coast. This work involved many hardships and much danger. At Neah Bay he made his observations behind breastworks with armed men on guard as a protection against hostile Indians. While in the Straits of Fuca a mutiny occurred on his schooner, the men attempting to overthrow their officers and escape to some new gold fields in British Columbia. Davidson was warned of approaching trouble by one of his loyal men and the mutiny was put down, but not until after one or two men were killed. The man who warned Davidson, a Portuguese called "Joe," remained in his employ for many years, and Dadvidson never forgot the debt of gratitude he owed him.

In 1889 Davidson's Pacific Coast Pilot was published as an official document. It contains a detailed description of the coast line and a voluminous mass of information gathered by Davidson and his colleagues in 38 years work on the coast. It is now out of print, but is highly prized by those fortunate enough to possess one.

From 1868 until his resignation in 1895, Davidson was in charge of all operations of the Coast and Geodetic Survey on the Pacific Coast. During this time he became a leader in astronomical, geographical and engineering circles and made great contributions to the science of geodesy and astronomy. For the last 10 years of his life he served as an honorary professor of Geography in the University of California.

Professor Davidson died in San Francisco December 1, 1911.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part X—Stowage

By L. L. Westling

THE next step in the development of our discussion of the Marine transportation of refrigerated shipments brings us to the consideration of stowage which is a highly specialized operation requiring an intimate knowledge of commodity requirements and of refrigerative and ventilation principles. As has been previously stated in these articles, the perfection of equipment and installation can be and often is completely nullified by improper stowage.

On shore it is usually possible to isolate each single class of commodity into a room kept at the exact condition best suited to that commodity. At sea this is practically impossible because of physical limitations and as a general rule the cargo in any one compartment would consist of numerous varieties of fruit, vegetables, and manufactured products. The present day tendency toward more frequent sailings and smaller consignments greatly aggravates this condition. Wherever such condition exists, great care must be exercised to separate the odor-emitting from the odor-absorbing items of the cargo.

On the great majority of modern trade routes, vessels in general service have many ports of loading and many ports of discharge and this places a great handicap on economic operation of refrigeration machinery and adds greatly to the complexity of the stowage problem.

For these and other reasons the installation of smaller compartments in the division of the refrigerated cargo space is becoming the general rule in constructing new and in reconditioning old vessels.

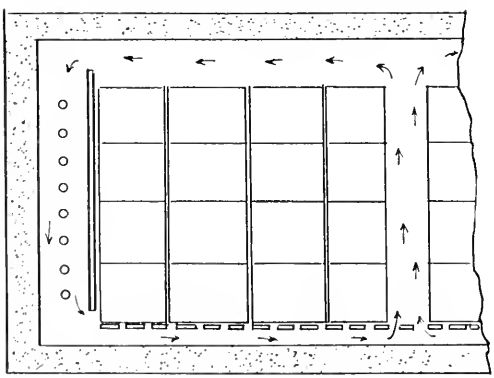
If all cargo were destined for a single port of call, the marine problem would be simplified. With single port discharge, wet, hardy, and heavily boxed items could be stowed on the floor and against the coils, delicate fruits, etc., could be stowed on top and center; but with numerous ports of call for discharge or loading, the cargo must be stowed to permit a minimum amount of handling and restowing and to permit of quickest movement. During these movements of cargo the doors should be kept closed as much as possible to prevent the in-rushing of warm, moist air, with the resultant general sweating of cargo. As we have already stated, whenever the cargo is at a lower temperature than the air by which it is surrounded, then that air will drop its moisture on the surface of the cargo, and the resulting "sweat" may cause great damage to many items of the cargo and particularly to meats and fruits.

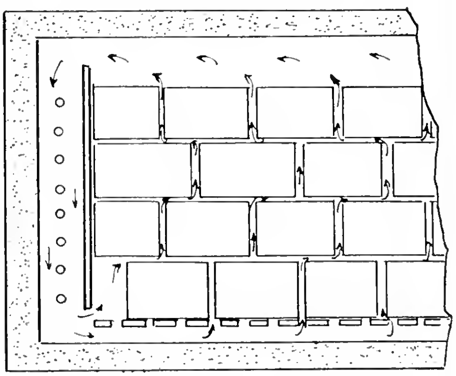
While it must be remembered that air temperature change is not cargo temperature change, yet the raising of the air temperature means an immediate demand for more work on the part of the refrigeration machinery, and so it behooves the carrier to make the most rapid movement of cargo that facilities and conditions will permit. The stowage plan, based upon point of delivery and upon classification of commodities, must be at best a compromise that only experts can successfully negotiate.

General Rules.

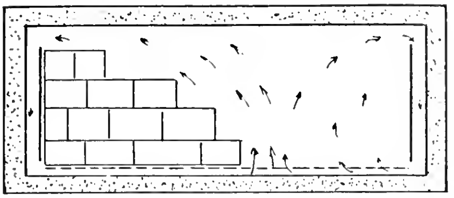
The factors influencing the stowage plan are entirely individual and must be determined at the time of loading, but there are certain general rules that should be adhered to in all cases.

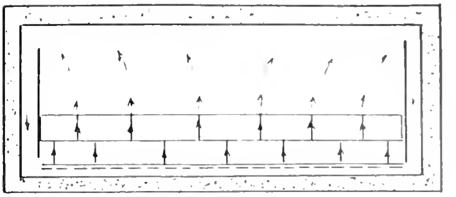
When physically possible, all packages that are liable





Diagrammatic elevation of refrigerator space with full cargo showing, at left, the incorrect method and, at right, the correct method of tiering.





Diagrammatic elevation of partially filled refrigerated spaces showing incorrect (left) and correct (right) methods of tiering partial cargo.

to drop moisture, such as ice packed lettuce, should be stowed on the floor gratings to insure proper drainage.

All hardy and strongly crated items should be stowed on the floor and the frost resistant articles stowed against the coil walls.

Delicate fruits, such as plums, berries, etc., and delicately constructed containers should be stowed at the top of the pile.

These rules will give margins of safety against mechanical damage and against freezing or frosting. When one has latitude in his stowing plans, the items that keep best at lower temperature should be stowed low, and those keeping best at a higher temperature may be stowed farthest from the coils.

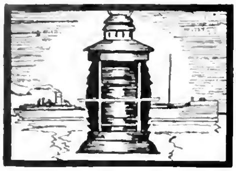
Space aboard ship is at a premium, and there is a tendency of the operator to overload the refrigerated chambers. Ample space for air movement through refrigerated cargo must be allowed. This space should be not less than 8 per cent. in freezers loaded with prefrozen cargo, and not less than 15 per cent. for chill or freezer space. Unless the air can readily cover a path through the cargo, to the coils and again to and through the cargo, heat removal cannot be accomplished. "Pockets" or points of retarted air movement create risk of having local freezing temperatures. Likewise, warm pockets can be expected to exist and will very probably be in the vicinity of the thermometers. The thermometers thus give erroneous indications, more refrigeration is applied, and the result is additional injury.

All walls against which no coils are laid, or where air movement may be impeded by cargo, should have permanent dunnage strips standing vertically to make it impossible to stow boxed goods flat against the surface. Flat contact makes the cargo act as an additional insulation from the outside, and too high temperature at that point is a certainty.

In stowing the cargo there should be no open vertical passages or spaces where the air currents can by-pass the cargo. Air streams are analogous to water streams, and will always follow lines of least resistance, and these lines should be through, not around, the cargo. Case or crated goods should, when practical, have dunnage between each tier, and never more than every second tier. Where dunnage separates tiers, the cases should be stagger piled like bricks, so that the air will pass completely around the crates, not along one face of it. Partly filled chambers should have evenly distributed cargo over the whole floor, not piled at one end, otherwise uniform temperatures are difficult to maintain.

From painting by Charles R. Patterson.

The American ship Henry B. Hyde shortening sail in a heavy breeze.



Marine Equipment

CENTURY'S PROGRESS — LARGEST DIESEL TUG
NEW DISTRESS SIGNAL — GYRO-STABILIZERS

A Century of Progress in Marine Transportation

PLANS for participating in "A Century of Progress" Exposition, Chicago's 1933 World's Fair, are being considered by leading steamship lines, manufacturers of marine equipment, supplies and machinery.

Steamship Hall, occupying the northwest side of the Travel and Transport Building already standing on Chicago's lake front, will house the exhibits of marine transportation during the 1933 Exposition.

As a novel feature to attract the attention of visitors, it is planned to reproduce a life-sized section of the exterior of a great ocean liner in Steamship Hall. Wharves and docks may give the appearance of an ocean port and a gangway spanning a stretch of water will carry visitors onto the deck.

Inside this ship exhibition halls will be installed. It is expected that there will be three decks. On the main deck it is planned to present exhibits of the various steamship companies. Such exhibits will give these companies an opportunity to dramatize to millions of visitors their travel accommodations and touring facilities, to tell the story of their accomplishments in transportation and to trace the history and improvement in marine transportation in the past hundred years. The millions of people who will visit these exhibits at the World's Fair in 1933 include many actual and potential travelers and shippers who may use the vessels and facilities of these steamship companies.

Exhibits of marine machinery, engines and equipment, it is expected, will be shown on the lower deck, because of the weight of these machines. Manufacturers of marine equipment will be able to trace the evolution of their machinery, and portray improvements which have resulted from the application of scientific discoveries and inventions. On the upper deck exhibits of marine and shipping supplies may be shown. A total of 22,435 square feet of exhibit space will be available for exhibitors of all types in Steamship Hall.

The Travel and Transport building is nearly 1,000 feet long and of striking architectural design. From one end to the other the building is windowless. The illumination effects for exhibits will be supplied artificially, thus giving absolute control at all times to the volume, direction and intensity of light. A metal sympathetic to a most dramatic night illumination scheme covers the structure.

The great dome which adjoins the main Travel and Transport building is a unique example of twentieth century architecture. It has been reserved for historic exhibits telling the story of the progress of all forms of transportation in the last hundred years, including water, rail, air and highway.

The roof of the dome is suspended by cables attached to huge steel towers, instead of being supported by pillars or trussed arches from below. The dome is 125 feet high and 200 feet in diameter.

Unusual architectural profile is presented by this facade of Steamship Hall, forming the northwest side of the Travel and Transportation Building, which is to house exhibits relating to transportation during the great Century of Progress Exposition to be held at Chicago in 1933.

Trade Literature

Plastic Products. The General Electric Company has recently issued catalog and price list, GEA-937B, covering plastic products, textolite laminated, textolite molded, cetec. Textolite is a synthetic resin utilized as a binder and is available in both laminated and plastic molded forms and in various grades. A complete description is contained in this booklet.

Gas Engine Driven Tiering Tructractor

A TIERING truck that steers with all four wheels, drives from the rear wheels, and is powered with a tractor-type gas engine capable of twenty-four hours' continuous operation is announced by the Clark Tructractor Company, Battle Creek, Michigan.

The Tiertop model Clark Tructractor transferring loads from car to truck.

The new method by which all four wheels turn in response to the steering control enables the truck to get into tight places with its load and get away easily. The turning radius is 94" and the truck will easily negotiate the corner of two intersecting 64" aisles with ample clearance on each side.

The hydraulic lift applies maximum power to point of service without drum or other complicated mechanisms. Besides utilizing all the advantages of the hydraulic lift it also cushions the descending load without shock.

Intelligent use of this tiering equipment will enable a ship or warehouse owner to make important savings in floor space by utilizing "air rights." Materials and equipment on skid platforms or in tote boxes are quickly moved from place to place and stacked in tiers. The "Tiertop" model is especially recommended for factory and warehouse use. It tiers a three-ton load to 6 feet in 30 seconds. Heavy dies may be positioned on presses, heavy units in process may be positioned on machine tools, material for storage is quickly and compactly tiered.

The "Tiermor" model tiers three tons to four feet in eighteen seconds, and, due to its low overall height, is especially adapted to loading and unloading freight cars. It enters the car and takes the load to the far end, spots it where it is to ride, and comes out of the car with no jockeying. Its flexible mobility and the construction, which permits the driver to have clear vision at all times are recited as important advantages.

New American Diesel Introduced by Seattle Firm

ANNOUNCEMENT of the American Diesel Engine, a newcomer in the diesel field, and also a newcomer into the field usually dominated by the small gasoline engine—that of sizes from 15 to 100 horsepower—was made recently. The builders, long identified with the diesel engine industry, have organized the American Diesel Engine Company of Seattle, using the fine large Salmon Bay plant of the old Gulowsen Grei engine works. They are strongly organized and ready to go into production, after nearly three years of careful experimentation work. L. F. Duvall is president of the new company, R. E. White is vice-president and chief engineer, and Charles Pedersen, formerly with the Gulowsen Grei Company as designer, is general superintendent and secretary.

The engine is a 2-cycle, 5x8 crosshead type, supercharging design and, while capable of much higher speeds and power, it is rated at 12½ horsepower per cylinder at 500 revolutions per minute.

High specific output is obtained by positive complete scavenging and a small degree of supercharging. The makers claim that they can show twice the power of a 4-cycle engine of the same bore and stroke at the rated revolutions.

The excess air demanded for this supercharging is obtained by combining the air displacements of the lower side of the power piston and the upper side of the cross head.

The outstanding feature of this construction is the very simple and direct way by which it is accomplished. The crosshead guide is merely a detachable liner fitted into a deep section plain crankcase. The upper end of the liner carries a diaphragm through which the piston rod operates and is suitably ported to give the necessary control of air flow.

The cylinder is of simple construction carrying the inlet poppet valve in a detachable head while the exhaust is through a system of ports entirely surrounding the cylinder at the end of the piston travel.

The drive of the inlet valve is by a cam shaft exposed to the oil spray in the crankcase. The injection system is a Bosch detachable unit with manual injection advance and retard mechanism and is driven from the after end of the cam shaft. Starting air is controlled by this same shaft.

The piston is a built-up type in which the cast iron portion carries the shock load, the heat, and the rings and is only 3 inches long. An aluminum alloy skirt affords the necessary seal over the exhaust ports when the piston is at upper center and adds no more than 18 ounces to the weight of the piston. The top of piston and combustion space are designed for high turbulence.

The piston rod is of alloy steel and drilled for lightness. The cast nickel iron crosshead is of the slipper type and carries two scraper rings to hold down the crankcase oil splash. The hollow wrist pin is of very liberal proportions and is anchored to the crosshead at one side only.

The connecting rod is a forging of tubular cross section and is made of heat-treated alloy steel. The wrist pin end is bronze bushed, while the large end is fitted with bronze backed babbitted shells.

The alloy crankshaft is of very liberal proportions exceeding Lloyds specifications for strength and is counterweighted for smooth running. Oil passages are drilled through the crankshaft to carry oil to all bearings. A small copper tube is flared into the hollow connecting rod to carry oil to the wrist pins.

The oiling system is constant pressure circulating to bearings, while a force feed lubricator supplies fresh oil to the pistons only.

The engine in a 2-cylinder model is rated and sold as a 25-horsepower engine upon which the makers guarantee a 20 per cent. continuous overload. The cylinder size of 5x8 will be available in two, four, six, and eight cylinder models. The characteristics of the 2-cylinder model are:

1. Piston displacement is 320 cubic inches.

2. Piston speed is 665 feet per minute. Total weight of engine 1800 pounds. Weight per rated horsepower 76 pounds.

3. 2-cylinder model is 47 inches high and 66 inches long over all.

4. Total scavenging air displacement is 160 per cent. of power piston.

5. The engine will not be made reversible but all models will be equipped with reverse gear.

Aerial Marine Flares for Lifeboat and Ship Signalling

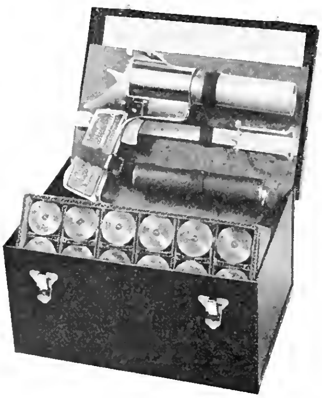
By Dr. Henry B. Faber

THE value of a distress signal is dependent upon the distance that it can be seen. Lifeboat equipment to-day includes hand distress signaling torches, but the range of such signals is limited by the curvature of the earth to less than five miles, as they function close to the water line.

At a meeting of the Executive Committee of the Marine Section of the National Safety Council held last May aboard the Eastern Steamship liner New York in New York harbor the new aerial marine flares, manufactured by the International Flare-Signal Co. of Tippecanoe City, Ohio, were discussed. As this equipment for lifeboat distress signaling has been approved by the United States Steamboat Inspection Service and adopted as standard equipment by the United States Coast Guard, the Executive Committee expressed a desire to see a practical test.

On the night of May 24 the patrol boats Reliance and Cuyahoga took a party out to Ambrose Lightship. From this point the two boats sailed a diverging course that separated them a mile every six minutes. The distress signals were shot periodically from one ship and were answered by the other until a distance of fifteen miles had separated the two ships. At this point, due to the late hour, the tests were concluded and the signals were then clear and distinct.

The equipment consists of a pistol durably constructed of brass and rust-proofed steel weighing approximately four pounds, which



Complete equipment for the new Aerial Marine Flares.

projects a six-ounce shell more than 200 feet in the air. At its maximum altitude the contents of the shell are expelled through the action of a delay fuse, and a parachute suspends the brilliantly burning flare. Red and white flares were used, red having an intensity of 30,000 candle power, the white 50,000 candle power. These flares burn for a period upward of thirty seconds with undiminished intensity. It is as if a 200-foot high lighthouse arises suddenly out of the sea and projects a 50,000 candle power beam in every direction.

Seated in a lifeboat, these illuminating red distress signals can be easily and safely fired and will increase the range of visibility more than 500 per cent. over the present equipment. The U. S. Coast Guard state that "tests show conclusively that the flare can readily be seen over water a distance of twenty miles, and if watched for can be seen up to a distance of twenty-five miles."

In addition to the signal being an aerial flare, it can also be used as a hand torch. The equipment provides a light hand holder for the signal and a supply of scratchers for manual ignition. This unique feature gives the flare a double service both as a hand torch and an aerial parachute flare. The pistol and flares were designed by ordnance men and are distinctly ordnance, the signal cartridge being moisture-proof.

New Mackay Radio Installations

MACKAY Radio and Telegraph Company is installing its new type ship radio equipment and Kolster radio compasses (direction finders) on the five new Baltimore Mail Line ships—City of Baltimore, City of Norfolk, City of Newport News, City of Havre, and City of Hamburg.

These new ship radio telegraph equipments are of a unique design combining both short wave and intermediate wave operations in one panel, using one vacuum tube and one motor generator, in contrast

Mackay Radio combination short wave and intermediate wave marine wireless equipment.

with the usual practice of using a complete separate unit for short waves. This results in compactness and a minimum of space requirements in radio installations for all types of ships.

Similar equipment has been installed on the four new American Export Line ships which are in direct and continuous touch with both the United States and Europe during their entire trip to Mediterranean and Black Sea ports. These vessels are the Excalibur, Exeter, Exochorda, and Excambion.

Radio communication on the high seas is thus keeping pace with rapid and dependable communication demands on shore and over sea.

Million-Gallon Navy Oil Contract

FOR the second successive year the Associated Oil company has been awarded the lubrication contract for the Pacific fleet of the United States Navy, and as a result Cycol motor oil will continue to be used in all Navy battleships, cruisers, aircraft, submarines, tractors, automobiles and other equipment for the 1931-32 fiscal year.

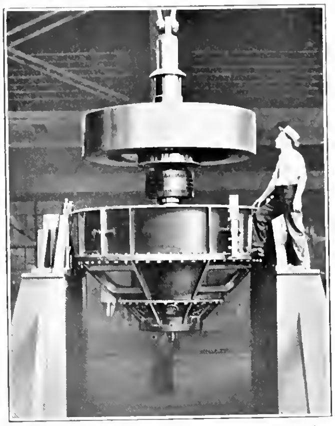
Nearly a million gallons of Cycol is involved in the important contract, according to P. E. Allan, domestic sales manager for Associated. Allan considers that the Navy's award on the basis of Cycol's lowest service cost is a tribute to its efficiency and economy.

"As last year, when Associated won the big western Navy lubrication contract, Cycol this year was again put to the same rigid tests evolved by government engineers, and in competition with leading brands, both eastern and western, again proved its economy and efficiency by showing the lowest service cost rating," Allan explained.

"The government does not buy oil on the basis of cost alone. Its buying is done with infinite care, with the object of getting the greatest possible lubrication per dollar.

"The tests are run in a specially designed bearing machine. Oil is pumped for 100 hours through a large Navy bearing running at high speed and under extremely high pressure and temperature. After this gruelling test the oil is tested for the degree of change from its original chemical and physical characteristics, and rated accordingly, the oil showing least 'wear' in service being the superior product. The numerical rating thus evolved is divided into the cost, the result being a factor expressing 'service cost'."

Officials of the Associated Oil Company are highly elated over the outstanding performance of Cycol in this year's tests.



19½-ton rotor being installed in case for the Sperry gyro-stabilizer for Italian destroyer Pigafetta.

Gyro-Stabilizer for Italian Destroyer

THE 2000-ton Italian destroyer leader Pigafetta is soon to be equipped with a Sperry gyro-stabilizer which should steady her sufficiently to make accurate gunfire possible in any weather. The rotor is 91 inches in diameter, thickness of rim is 22 inches, and the total weight of the rotating element is 38,800 pounds. Maximum speed is 1350 revolutions per minute giving a peripheral speed of 32,000 feet per minute.

The rotor was so carefully machined that only 7½ ounces of weight change was made on one side to assure accurate balance and smooth operation. An unusual feature of this rotor is the small diameter as compared to the thickness. This makes for unusual economy of space without sacrificing its roll-quenching power.

This stabilizer was designed by engineers of the Sperry Gyroscope Company, Inc., and is now being completed under their supervision at the South Philadelphia works of the Westinghouse Company, and will be installed and in service this year.

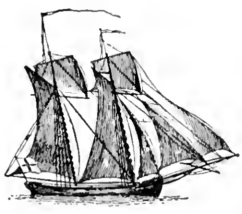
Book Review

American Foreign Trade in 1931, the annual report on international trade of the National Foreign Trade Council, emphasizes the paramount need to "stop profitless merchandising" as the first requisite to recovery. The Council calls attention to the fact that although wholesale commodity prices in the United States have been reduced by an average of 1¼ per cent per month during the past two years, that reduction is now proceeding at a rate of slightly less than one-half of one per cent per month, with the strongly marked indication that the trend of American trade may presently return to stable prices and a resumption of rising values.

The nineteen sessions of the convention heard 51 addresses on various phases of the foreign trade situation, and comprise the most comprehensive record of the foreign trade situation which the Council has issued in recent years. A new feature of the convention was a series of "foreign trade appraisal" luncheons in which nine first - line industries sent their leading spokesmen to a "convention within a convention".

The three-day session was attended by 1,567 delegates from 35 states and territories of the Union and 24 foreign countries, and was the largest meeting the Council has held in the east, excepting that in Baltimore two years ago.

The report is provided with a 16-page index for ready reference and contains a verbatim record of the group sessions held by advertisers, credit men, export managers, foreign trade bankers, and the American Manufacturers Export Association.



Trade Literature

Philadelphia Maritime Exchange Annual, 1931, has been received and is found to be the Fifty-Sixth annual report of the Board of Directors. Besides containing a list of the officers, directors, and members of the Maritime Exchange, the book is filled with important port and harbor data, such as improvements to the harbor and tributary canals and rivers, facilities for docking and towage, listings of piers and other harbor facilities, etc. The book should be of much interest and benefit to all ship operators and shippers engaged in business with Philadelphia.

Modernize with G-E Controllers is the title of a very strongly put argument in picture and print recently issued by the General Electric Company which is listed under GES-689. The leaflet is profusely illustrated with a few of the hundreds of modernization opportunities offered by new type controllers.

General Electric Company has recently issued the following list of loose-leaf catalog leaves, which we shall gladly send on request to our Editorial Department:

GEA-61C—Constant - speed Direct-current Motors, Type CD, 3 to 200 horsepower, 4 and 6 poles; shunt or compound-wound.

GEA-752A—Direct - Current Motors, Type BD, ½-3 horsepower, constant speed shunt or compound wound; ½-1 horsepower adjustable speed shunt-wound.

GEA-957B—Mechanical - Drive Turbines, Type D-52, condensing or noncondensing, up to 600 horsepower, up to 6000 R.P.M.

GEA-1296A—CR9517 Brakes for Direct-current Motors.

GEA-1437—Built-in Speed Reducers for general-purpose, ball-bearing, General-Electric Induction Motors.

GEA-1423—Solenoid Operated Valves. (Described in September issue of this magazine.)

GEA-1418—CR2960 - SY108 and -SY113 Pole-changing switches for Multispeed, changeable-pole, 2- or 3-phase motors.

GEA-1419—CR7006-D42 Combination Magnetic Switch across-the-line starter for induction motors.

GEA-894—Adjustable - speed Direct-current Motors Type CD, shunt wound, 115 and 230 volts; speed 2:1, 3:1, and 4:1.

GEA-1393—Centrifugal Air Compressors—Single Stage.

GEA-1335—Turbine - Generator Sets—Alternating-current, 10 Kw. to 300 Kw.

GEA-712B—Type BTA motors—Adjustable speed, alternating current, brush shifting, 3 phase, 60 cycles, 220, 440, 550 volts.

GEA-1412—Solid Shaft Vertical Induction Motors—Type K, ½ to 5 horsepower, Types K and KF, 7½ to 15 horsepower.

GEA-1383—General - Purpose Squirrel-Cage Induction Motors, open, horizontal frames, 3 phase, Type K, two phase.

GEA-528A—Centrifugal Air Compressors, small, multistage.

GEA-1326A — Totally enclosed, Fan-cooled Induction Motors — 3 phase, Type K, 2 phase.

General Electric Soldering Iron is described in a little leaflet distributed by the General Electric Supply Corp., which we shall gladly send you on request. (GEC-34A.)

Marine Generators. Westinghouse Electric & Manufacturing Company announce the completion of a new publication covering their marine type SK generators and automatic cut-out panels for trawlers, yachts, tugs, and workboats. This publication, listed as D.M.F. 5385, includes information on the application, construction, and operation of this equipment as well as ordering information on style numbers.

New Catalogs. Tabulated below is a list of all new catalogs, bulletins, etc., released by the Worthington Pump and Machinery Corporation during the past month. If desired, a copy of any of the following will be sent upon application to the Editorial Department, Pacific Marine Review.

Steam-Air Ejectors, for stationary and marine service. Specification Sheet W-205-B1, 12 pages. Supersedes BK-1841.

Centrifugal Pumps, Types CA and CB. Specification Sheet W-310-S12A, 4 pages. Supersedes W-310-S12.

Centrifugal Pumps, Type WF; multi-stage turbine. Specification Sheet W-319-S3, 4 pages. Supersedes W-310-S2A.

Dry Vacuum Pumps, Two-Stage; Feather Valve; single horizontal; belt and steam driven. Specification Sheet L-711-S3; 4 pages. Supersedes L-317 & L-318.

Horizontal Duplex Pot Type, Piston Pattern Pumps for Oil; Type P.T.; 18-inch stroke; maximum working pressure: Steam end—150 lb.; liquid end—Wompco, 250 lb., cast steel, 500 lb.; various capacities and various liquid piston diameters. Specification Sheet W-112-S15, 4 pages.

Book Review

CABIN SONGS. The travelers own song book—"A collection of old time melodies with up-to-date words." By Elizabeth J. Stephens. 48 pages in paper cover; published by Bruce Humphries, Inc., Boston. Price 50 cents.

This is an excellent collection of favorite old melodies. Just why the words should be called up-to-date does not appear to this reviewer.

Most of the melodies used in this book were composed to emphasize the spirit of simple folk lore, negro spirituals, sailors' chants, or love ditties. The most that can be said for the doggerel rhymes fitted to these tunes in "Cabin Songs" is that the author has certainly provided a separate syllable for each note in the score.

World's Largest and Most Powerful Diesel Towboat

ON the 25th of August the Dubuque Boat & Boiler Co. of Dubuque, Iowa, delivered the towboat Herbert Hoover to the Inland Waterways Corporation. This towboat, a tunnel-stern, twin-screw, steel vessel, is the largest and most powerful diesel driven towboat in the world. Her principal characteristics are:

Length over-all	226′4¾″
Length, molded	215′0″
Beam, molded	43′6″
Depth, molded	10′0″
Camber	8″
Draft (150 tons of fuel)	6′0″
Sheer forward	2′3″
Sheer aft	1′1″
Shaft horsepower	2200
Propeller Diameter	8′0″
Propeller pitch	6′5″
Propeller speed	200 R.P.M.

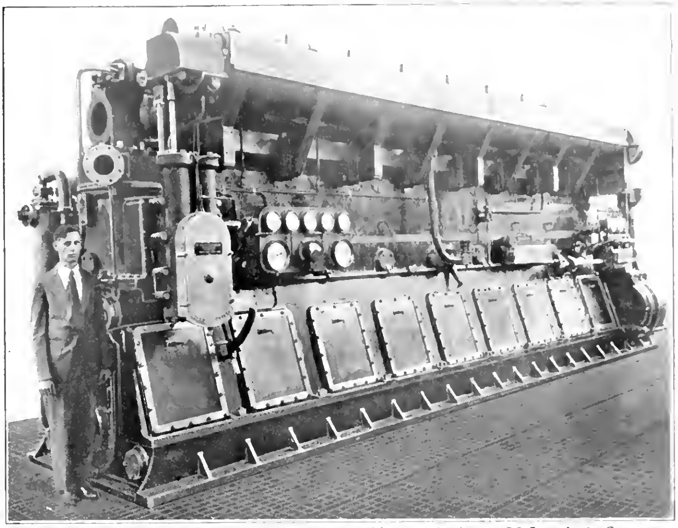
This vessel was designed and built for the purpose of moving freight on barges on the Mississippi River. Her regular schedule will call for an up-river average speed of 4 miles an hour, moving 10,000 tons of freight between New Orleans and St. Louis. The machinery space amidships is 53 feet long and 33 feet wide, the floor being 6 feet below main deck level. In this space are installed the propulsion machinery and auxiliary plants.

Propulsion Machinery

Two McIntosh & Seymour 4-cycle, air-injection, directly reversible, full diesel engines drive the two propellers. Each of these engines has eight power cylinders of 20 inches bore and 24 inches stroke and has a rated normal capacity of 1466 indicated horsepower, 1100 shaft horsepower at 200 revolutions per minute, with overload capacity rating of 1300 shaft horsepower at 230 revolutions per minute.

They are of the trunk piston type built along very compact lines, permitting low weight per horsepower. Pistons are oil-cooled, the oil being led to and from the pistons by swinging joints, cooling oil and lubricating oil using a common sump tank.

The maneuvering functions of this engine are controlled by two handles, one for starting air and fuel, the other for air rams controlling the position of ahead or astern cams. These two levers are so interlocked as to prevent interference in maneuvering operations.



One of two 4-cycle, air-injection, directly reversible, trunk-piston, McIntosh & Seymour, 1100 brake horsepower diesel engines for the Inland Waterways Corporation towboat Herbert Hoover.

A Kingsbury thrust bearing is mounted independently aft of the engine base.

The propellers are set wide apart in tunnels under the stern. Consequently the engines are widely spaced and the three auxiliary generating sets, the switchboard, and the auxiliary compressor are installed between the main engines. These auxiliary sets are all Atlas-Imperial-Westinghouse diesel generating units, two of 75 kilowatts capacity each and one of 15 kilowatts capacity.

The pumps are all Westinghouse electric motor driven Worthington. Deck and steering machinery is American Engineering Company make. There are four rudders in pairs. One pair forward of the propellers, the other pair aft. Each of these pairs is operated by a separate hydro-electric steering gear located in the engine room and mechanically controlled by separate levers in the pilot house and operating the rudders through cables and quadrants. Each pair of rudders moves as its controlling lever moves.

There is ample provision for comfort of crew, plenty of room and ventilation, plenty of good food. There are eight baths, hot and cold running water in each room, steam heat, and abundance of electric light. The galley is equipped with a Webb oil-fired range, ample steam table capacity, and many electric devices. Large store rooms are kept refrigerated by a Lipman 2-ton unit.

The towboat Herbert Hoover is now in operation demonstrating diesel economy and moving freight at very low unit cost.

Trade Note

Special Equipment for New Vessels.—Goodrich Cutless Bearings will be original equipment on the lighthouse tender Cherry, now under construction for the U. S. Bureau of Lighthouses at the Leathem D. Smith Dock Co., Sturgeon Bay, Wisconsin. The B. F. Goodrich Rubber Company will supply 7-inch bearing for this vessel.

The Berg Shipbuilding Company, Seattle, is building a 65-foot survey boat for the U. S. Engineers, San Francisco. This vessel will be equipped with six Goodrich Cutless Bearings for 3¼-inch shaft. There are three bearings for each shaft of this twin-screw boat.

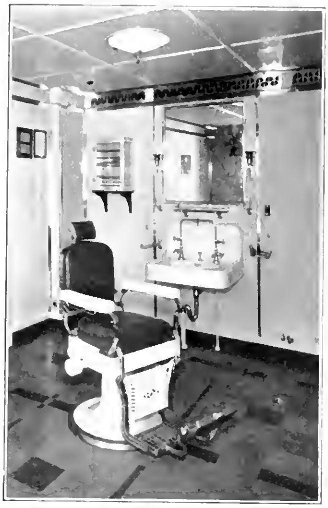
Allegheny Metal on Shipboard

THE interior decorators of the new Dollar Line steamship President Hoover, now on her maiden voyage to the Orient, have secured some interesting and novel effects by the use of the chromium nickel alloy, Allegheny metal. This metal has the color of silver and is nontarnishing.

One of the most interesting of these applications is on the four doors of the main smoking room. These doors have panels, 26½ by 60 inches, of satin-finish Allegheny metal over Armorply plywood. The panel is decorated with lattice work of polished brass to obtain color contrast, and an ornamental glass panel is set in the center.

The use of plywood as a backing for the metal is comparatively new. Its principal advantage in the present instance is that it gives light gauges of the metal the flat surface and body that ordinarily would be obtained by the use of a heavy gauge, thereby making a material saving in weight. Another advantage claimed for the use of the plywood is the high degree of insulation against both heat and sound.

A second interesting use of the alloy in this same room is in the framing of a large terra cotta panel over the fireplace. This panel, enameled in bright colors, has a frame of carved wood, enameled in the same colors as the panel. The inner and outer edges of the frame are bordered with strips of hammered Allegheny metal, with ornamental rivet heads. This beaten surface in itself is a novelty in the treatment of this new alloy. The opening of the dark marble fireplace is bordered with the same alloy in a satin finish trimmed with polished brass.



Lavish use of Allegheny metal trim produes a cheerful atmosphere in the steamship President Hoover's barber shop.

The beauty parlor and barber shop, adjoining each other, have white painted walls divided into panels by narrow strips of polished Allegheny metal, and two similar strips of the metal are run around the top of the side walls near the ceiling line.

The designers of the interior of the vessel are A. F. Marten Co. of San Francisco. The decorative work was fabricated by the Newport News Ship Building and Dry Dock Company, builders of the vessel.

Quite different from this decorative use of the alloy, but based on the same qualities of resistance to salt air corrosion, is its use in the galley, where it is the material out of which table and dresser tops and similar equipment were made.

This chromium nickel ferrous alloy, manufactured by the Allegheny Steel Company, is an ideal material for many uses on shipboard. Pacific Coast sales manager for Allegheny is J. Allan Armstrong of Los Angeles, and the metal is handled in the San Francisco Bay section by Chas. M. Tuttich of Dunham, Carrigan and Hayden.

The after bulkhead of the smoking room on the Steamship President Hoover featuring the attractive use of Allegheny metal on doors and the grand fireplace.

Trade Literature

New Power Plants for Old Ships.—The need for increased speed for older steamships in order to meet the competition of recently equipped vessels, as well as the desire to benefit from mail subsidies, is leading to the reconditioning of a number of ships built during, or soon after, the war.

An example is the City of Baltimore, the first of five vessels to be reconditioned for the transatlantic service by the Baltimore Mail Steamship Company. This ship was originally equipped with turbine electric drive and had a normal sea speed of 10½ knots. After being reconstructed by the Federal Shipbuilding & Dry Dock Company, in accordance with plans prepared by Gibbs & Cox, Inc., and equipped with a De Laval compound double reduction geared turbine receiving steam at 250 pounds per square inch, with 100 degrees Fahrenheit superheat, an average speed of 17.77 knots was developed on the official sea trials, a maximum of 18.01 knots being reached. The fuel consumption for all purposes worked out as 0.74 pound of bunker oil per shaft horsepower.

The conversion is fully described and illustrated in a leaflet distributed by the De Laval Steam Turbine Company, Trenton, N. J., which company, in addition to building the propelling unit, also supplied the turbine-driven forced draft fans and boiler feed pumps.

American Shipbuilding

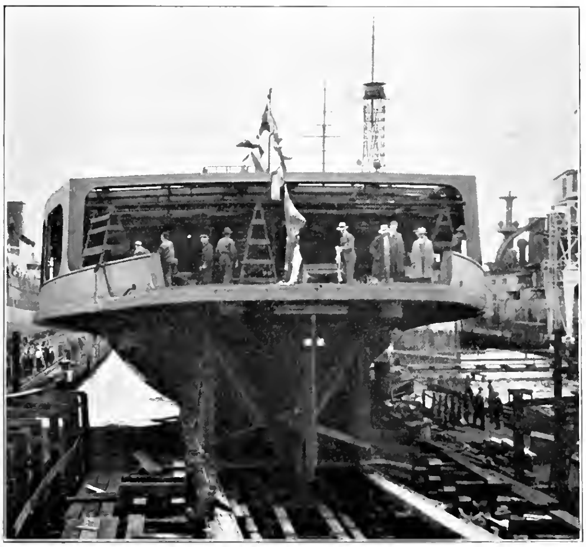
Edited by H. C. McKinnon

Moore Yard Launches Ferryboat and Delivers Lighthouse Tender

THE Moore Dry Dock Company, Oakland, Calif., recently launched the diesel ferryboat San Diego for the San-Diego-Coronado Ferry Company. This vessel is of steel construction, double-end, and will be powered with diesel-electric propelling plant. She is 204ft. 11in. over-all and has a breadth on deck of 43ft. 6in. The vessel is similar to the Coronado, built for the same owners several years ago. The superstructure has open panel type sides. The ferry will be able to carry about 58 automobiles and will have accommodations on the upper deck for about 200 passengers.

The power plant will consist of three 4-cycle, 6-cylinder Atlas-Imperial diesel engines of 350 brake horsepower each at 275 revolutions per minute. Each engine is to be direct-connected to one 225-kilowatt, 167-volt Westinghouse direct-current generator and one 30-kilowatt exciter. These generators will be connected through the Ward-Leonard control system to two 750-shaft horsepower, Westinghouse propelling motors.

At right: Lighthouse tender Columbine at the outfitting dock. Below: Ferryboat San Diego sliding down the ways at The Moore Dry Dock Co.



This yard has also just completed the 112-ft. lighthouse tender Columbine for the U.S. Bureau of Lighthouses, San Francisco. The craft is a well equipped vessel of steel construction. She is 111 ft. 8 in. at waterline and has 25 ft. molded beam and is 9 ft. depth. She is propelled by diesel-electric machinery supplied by Atlas-Imperial Diesel Engine Co. and the General Electric Co., which drives her at a speed of 9½ knots.

Destroyer Bids Opened. — Bids were opened at the office of the Navy Department, Washington, D. C., September 16, for the construction of two destroyers authorized by Act of August 29, 1916. Tenders were received for one or two destroyers from seven private shipyards and estimates were received from five navy yards. The estimates of the Navy Yards were not announced. The bids from private yards were as follows:

Bath Iron Works Corporation, Bath, Me.: One destroyer, department design within 30 months, $2,-626,000. Two destroyers, department design, one within 30 months, the second within 33 months, $2,-380,000 each.

One destroyer, builder's design, within 30 months, $3,166,000; two destroyers, builder's design, one within 30 months, the second within 33 months, $2,931,000 each.

Bethlehem Shipbuilding Corporation, Quincy, Mass.: One destroyer, department design, within 24 months, $2,893,000; two destroyers, department design, the first within 24 months, the second, 26 months, $2,615,000 each; one destroyer, builder's design, within 26 months, $3,044,000; two destroyers, builder's design, one within 26 months, the second, 28 months, $2,738,000 each.

Maryland Dry Dock Co., Baltimore: One destroyer, Department design, within 30 months, $3,804,-982; two destroyers, Department design, first within 30 months, the second 33 months, $3,664,433 each; no bids were offered in the builder's specification class.

Newport News Shipbuilding & Dry Dock Co., Newport News, Va.: One destroyer, Department design, within 27 months, $3,040,000; two destroyers, Department design, the first in 27 months, the second, 30 months, $2,660,000 each; one destroyer, builder's design, within 27 months, $3,080,000; two destroyers, builder's design, the first within 27 months, the second within 30 months, $2,700,000 each.

New York Shipbuilding Co., Camden, N. J.: One destroyer, Department design, within 25 months, $2,-925,000; two destroyers, Department design, 25 and 28 months, $2,-675,000 each.

Pusey & Jones Corporation, Wilmington, Del.: One destroyer, Department design, 26 months, $2,-895,000.

United Dry Docks, Inc., New York: One destroyer, department design, 20 months, $2,645,000; two destroyers, department design, 20 months and 22 months, $2,500,000 each.

Estimates also were submitted by the Navy Yards at Boston, New York, Charleston, S. C., Mare Island, Calif., and Bremerton, Wash. These estimates will be studied, together with the bids received from the private builders and the low bidder announced by the Department.

Mobile Oceanic Line to Recondition Fleet.—Approval of all terms and conditions of a contract of sale under which the Mobile Oceanic Line is to be transferred to the Waterman Steamship Company, of Mobile, Alabama, was granted by the Shipping Board September 9. The price to be paid for the line is $1,108,080, payment to be made on the basis of 25 per cent. down with the balance payable over a period of seven and one-half years. Interest on unpaid balances will be at the rate of 4¼ per cent.

The line includes fourteen steel cargo steamers and maintains a regular service between Mobile and other East Gulf ports and the United Kingdom, Ireland, and Continental European ports from Bordeaux north. The contract of sale anticipates the reconditioning of 10 of the fourteen vessels to give them speed of 13 knots. The present speed of the vessels is 10 knots.

Under the terms of the sale, the Waterman Steamship Company agrees to operate the line over the present route making not less than 52 outward voyages a year, of which not less than two shall be made in each and every month. As soon as the contract is signed, delivery of the vessels will be made as each vessel completes its current voyage.

Cruiser Keel Laying.—On Admission Day, September 9, California's state holiday, the keel laying ceremony for the new 10,000-ton cruiser San Francisco was performed at the Mare Island Navy Yard under the direction of Captain W. P. Druley, manager of the yard. The cruiser San Francisco is the fifteenth of her type to be built under the Limitations of Armaments Washington Treaty of 1922. She is scheduled for delivery in February, 1934, and will cost approximately $9,000,000, exclusive of armaments.

Overseas Ferry Bids.—Bids were opened in the office of the Overseas Railways, Inc., Hibernia Bank Bldg., New Orleans, La., and 11 Broadway, New York, on September 8, for the construction of a seagoing car ferry for operation between New Orleans and Havana, Cuba. The vessel is to be similar to the ferry Seatrain and will be approximately 455 feet long, 63 ft. beam, 38 ft. depth, and powered by double reduction geared turbines to give a speed of 14½ knots.

Loan Granted Colombian Line.—Loans in aid of building two steel passenger-cargo steamers for the Colombian Mail Steamship Corporation of New York were authorized by the Shipping Board September 16. The vessels are to cost $2,300,-000 each and the loans will be for three-fourths the cost, but in any case not to exceed $1,725,000. When completed the vessels will be placed in service on Ocean Mail Route No. 19 covering New York to Puerto Colombia and/or Cartagena, Colombia, via Port-au-Prince, Haiti, and Kingston, Jamaica. Repayment of the loan will be made over a 20-year period with interest at the lowest legal rate payable semi-annually.

The vessels are to be built by Newport News Shipbuilding and Drydock Company, Newport News, Va. They will be combination passenger and cargo steamers especially designed for the service in which they will be engaged. They will be 404 feet 3 inches in length, 57 feet 6 inches beam, and 23 feet 6 inches draft, with a total deadweight of 4400 tons. They will be equipped with geared turbine propelling machinery having a normal shaft horsepower of 6500 which will give a speed of 16 knots. A total of 54,000 cubic feet of refrigerated space will be provided for carrying fruit and other perishable cargoes.

Pacific Coast Firm Plans New Construction. — Following the granting of contract for the carriage of United States Mail between the Pacific Coast ports, originating in Seattle, and ports of Tampico, Mexico, Puerto Colombia, Colombia, via Kingston, Jamaica, the Gulf-Pacific Line (Swayne & Hoyt, Inc.) with headquarters at 240 Front Street, San Francisco, has applied to the Shipping Board for a loan for the construction of two vessels. These vessels will be built to comply with the mail contract and in accordance with the provision of the Merchant Marine Act, 1928. They will be primarily freight carriers, and will accommodate a limited passenger list. As soon as assurance of a Shipping Board loan is given, the company will draw up plans and specifications for the construction of the vessels.

Todd Plant Gets Repair Job.—One of the biggest repair jobs in the Pacific Northwest this year was awarded recently to Todd Dry Docks, Inc., on the steamship Bellingham of the Tacoma-Oriental Steamship Company. The work involved the building of a new stem and the removal for fairing and replacement of over 30 plates. The Bellingham was damaged in collision with a Japanese vessel while on a voyage to the Orient.

Survey Vessel Launched. — The survey vessel Mamala for the Hawaiian Service of the U.S.A. Engineers Office, San Francisco, was launched September 1 by the Berg Shipbuilding Company, Seattle. The vessel is 65 ft. long, 16 ft. beam, and of 40 tons displacement. She will be powered by twin Atlas-Imperial diesel engines developing

280 horsepower each and will be sent to Honolulu under her own power.

Miss Elizabeth Sturtevant, 15 year old daughter of Major Clarence L. Sturtevant, United States district engineer at Seattle, was the sponsor. The launching was attended also by Col. Thomas M. Robins, U. S. division engineer with headquarters in San Francisco.

New Yacht Completed. — The Harbor Boat Building Company at Terminal Island, San Pedro, recently completed the diesel yacht Holiday for Arthur Morris of Los Angeles. The yard has considerable repair work on hand and is building several bird-type sailing vessels which are showing increasing popularity in southern California sporting circles.

Recondition Vessels.—According to an announcement to the press by R. Stanley Dollar the entire fleet of 22 vessels recently purchased from the Transmarine Corporation will be brought to the Pacific Coast, the first two having sailed last month from Newark. Part of this fleet will be reconditioned on the Pacific Coast and placed in service out of Pacific Coast ports.

Large Repair Order. — General Engineering & Drydock Co. was low bidder at $54,345 and 25 days for repairs to the General Petroleum tanker Emidio. The vessel scraped her bottom off Point Arguello.

President Coolidge Has Speed Trials.—The newest Dollar Steamship Company liner — Steamship President Coolidge — underwent her sea trials early in September and gave a very good account of herself and her machinery showed very creditable performance. On the speed tests, she recorded a speed of 22.9 knots. The required speed under specifications is 21 knots.

The Steamship President Coolidge is equipped with turbo-electric propulsion plant manufactured by the Westinghouse Electric & Manufacturing Company. In all other respects she is like her sister ship, steamship President Hoover, having length over all of 653 feet, 81 ft. beam, 53 ft. depth. She is especially designed for transpacific service and will be one of the most beautiful vessels in the American merchant marine. Accommodations will be provided for almost 1000 passengers in four classes; namely, first, special, third, and steerage. Delivery date is set for October and she is scheduled to arrive in San Francisco on her maiden voyage November 4.

The above photograph shows the new fishing vessel City of San Francisco being launched into the waters of the Lagoon at Fishermen's Wharf, San Francisco, by the Haviside Derrick Barge No. 4. The vessel is 92 ft. long and weighs 110 tons. She was built at Fishermen's Wharf by the Genoa Boat Works for Beviazzna & Son, and is to be powered with Western-Enterprise diesel engines. Although the Haviside No. 4 has capacity for only 100 tons, the fishing boat was lowered without a scratch into the water, with a leeway of only a few inches on each side.

Largest Fishing Vessel Conversion Job.—The former mystery ship Chihuahua, which has been laid up for several years in San Francisco Bay, has been purchased by the Pacific Deep Sea Fishing Corp. of Wilmington, California, and towed to that port, where she will be reconditioned for the purpose of cruising for albacore. According to preliminary plans announced by the owners, she will undergo conversion into a 600-ton capacity combination deepsea fisherman "freezer" and carrier for the search of albacore in the southern seas. Hikokuma Shiraishi is general manager of the fishing company. Charles L. Houghton, with offices in San Pedro, is technical adviser for the firm and anounced that bids for conversion of the vessel will be asked shortly.

Bids to be Asked Soon on Reconditioning.—With the signing of the contract September 18 for the sale of the American Diamond Lines to the Black Diamond Steamship Corp. of New York, bids will soon be asked for the reconditioning of five of the vessels of the fleet under the provisions of the terms of the sale. These vessels are to be reconditioned to increase their speed from 10 to 13 knots. The American Diamond Line fleet consists of twelve typical 10-knot Hog-Island Shipping Board freighters with dimensions 390 ft. by 58.2 ft. by 27.8 ft.

The provisions of the sale also call for the construction of four and possibly five new 16-knot freighters during a ten-year period.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of September 1, 1931

Pacific Coast

BERG SHIPBUILDING CO.,
28th Ave., N.W., Seattle, Wn.

Survey vessel for Hawaii for the U. S. Army Engineers Office, San Francisco; 65 x 16; 40 tons displ.; Atlas-Imperial diesel; **launched 9/1/31.**

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Polson Bldg., Seattle, Wn., for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1200 B.H.P. McIntosh & Seymour diesel eng.; 14 knots speed.

GENERAL ENGINEERING & DRY DOCK CO.
Oakland, Calif.

Purchasing Agent: A. Wanner.

W. M. Wightman, boarding tug for Quarantine Division, Public Health Service, San Francisco; 60'10" over-all; 15 beam; 7'2" depth; 120 H.P. Fairbanks-Morse diesel eng.; launched 6/18/31; delivered.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; **launched 7/27/31;** deliver 9/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; **launched 9/14/31.**

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; **keel 9/1/31.**

BETHLEHEM SHIPBUILDING CORP., LTD.,
Union Plant

General reconditioning: Calif. training ship California State. Drydocked, cleaned, painted, misc. repairs: stmr. Tamiahua, stmr. Cuzco, stmr. Admiral Holstead, ferry San Pedro, yacht Alma, U.S.A. transport Cambrai, Shell barge No. 9, General Pet. barge No. 1, launch Reliance. Drydock and misc. repairs: stmr. Satanta. Load line assignment work and misc. repairs: stmr. Nora. Calibrate steam pressure gauges: stmr. Tejon. Miscellaneous work: stmrs. Mojave, President Wilson, City of Los Angeles, Argyll, Stuart Dollar, Empire Arrow, Maunganui, Suriname, President Wilson, Pennsylvania, La Perla, Point Chico, Limon, Saramacca, motorships Lio, Zaragoza, Otokia, tug Lebec, launch Patriotic, launch Horizon, tug Pilot.

CHARLESTON DRYDOCK & MACHINERY CO.,
Charleston, S. C.

General minor repairs to U. S. Lighthouse tender Cypress.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydocked, cleaned, painted, misc. repair: Willzipo, stmr. Wallingford (also engine and deck dept. repairs), stmr. Golden Dragon (also caulked misc. rivets), West Nilus (also overhauled sea valves, repacked stern gland, ranged anchor chains, caulk rivets and seams), tug Hercules, stmr. Golden River (also overhauled sea valves), Yarraville, Hawaiian (also drew tail shaft, renewed stern tube complete, caulked and renewed misc. rivets, renewed propeller hub), m.s. Californian (also caulked misc. rivets and seam, drew tail shaft for examination, rewooded outboard bearing), Vanguard (also unshipped rudder, renewed fender guards), Golden Bear (also overhauled sea valves, drew tail shaft for examination, rewooded outboard bearing, reset pitch of propeller), Democracy, Chas. R. McCormick (also overhauled sea valves, repacked stern gland, caulked and welded misc. rivets and seam), Dorothy Cahill (also overhauled sea valves, renewed section (lower) of rudder stock), Willkena (also drew tail shaft, rewooded outboard bearing, caulked misc. rivets and seam). Drydocked, cleaned, painted: Ohioan, yacht Janidore. Drydocked: cutter Smith. Drydocked for damage repairs: W. P. Barge No. 1.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle, Wn.

Grounding damage repairs: stmr. Admiral Schree. Collision damage repairs: stmr. Bellingham. Drydocked for change of propeller: stmr. Northland. Drydocked, cleaned, painted: stmr. S. A. Perkins. Voyage repairs: stmr. President Taft. Misc. repairs: stmrs. Stuart Dollar, Comanche, Chippewa, barge Betsey Ross.

U. S. NAVY YARD,
Bremerton, Wn.

Drydocked and misc. repairs: California, New York, Rathburne, Dorsey. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; **10 keels laid; 8 launched; 7 delivered.**

BATH IRON WORKS
Bath, Maine

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31; deliver 11/2/31 est.

Caroline, hull 141, twin-screw diesel yacht, owner not named, 286 ft. length; 3000 H.P. diesel eng.; keel 9/1/30; launched 7/18/31; **delivered 9/18/31.**

Felicia, hull 145, twin screw steel yacht, owner not named; 140 L.B.P.; 24'10" beam; 8'6" draft; 14 knots speed; two 400 H.P. diesel engs.; keel 3/30/31; launched 8/1/31; **delivered 9/15/31.**

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 5/1/31; launch 11/9/31; deliver 11/29/31 est.

Hull 148, same as above; keel 5/6/31; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31; deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31.

Monterey, hull 1441, sister to above.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

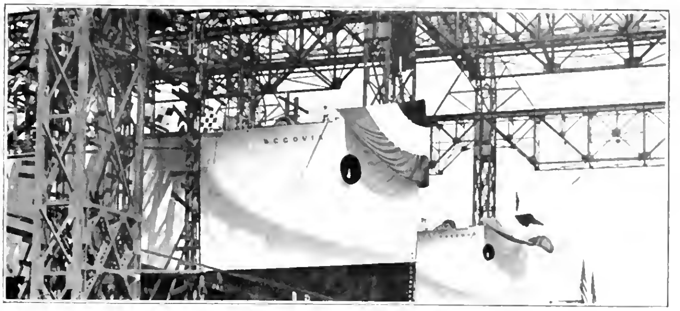
Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launch 10/25/31 est.

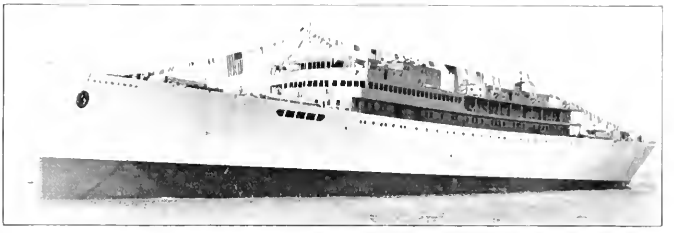
Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.





Views taken at the launching of the passenger-cargo vessels Talamanca and Segovia, August 15, at Newport News Shipbuilding & Drydock Co. These are two of the three building at this plant for the United Mail Steamship Company, with dimensions 446 L.O.A., 60 beam, 34 depth, 24 loaded draft. They are to be powered with turbo-electric power plant giving them a speed of 17½ knots. They are scheduled for service between North and South America

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I H P.; 2 Scotch boilers, 13'6" diam.; **keel 8/12/31.**

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **26 delivered.**

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x 11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia; **4 delivered.**

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1133, one 15-ton whirler derrick boat for U. S. Eng. Office, Pittsburgh, Pa.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Herbert Hoover, twin tunnel screw river towboat for U.S. Army Engineers; 215 ft. long, 42 ft. beam; two McIntosh & Seymour diesel engs.; 2600 H.P.; launched 7/2/31; **delivered 8/25/31.**

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31.

Not named, hull 122, sister to above; keel 8/4/31.

Not named, hull 123, sister to above for Grace Steamship Co., New York.

Not named, hull 124, sister to above.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; **launched 8/29/31;** deliver 12/21/31 est.

One steel maneuver boat hull for U. S. Engineers Office, Cincinnati; complete with derrick; 75 x 24 x 4'6"; keel 6/25/31; **delivered 8/14/31.**

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; **3 delivered.**

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

MIDLAND BARGE COMPANY
Midland, Pa.

Five barges for Inland Waterways, Corp., Washington, D.C.; 230 x 45 x 11 ft.; 4 keels laid; launched: **3 delivered.**

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 248, pile driver for U.S. Engineers, Memphis; 80 L.B.P.; 27 beam; 4 depth; 1 horizontal type boiler, 46" dia., 28'0" length; keel 1/12/31; launched 3/5/31; **delivered 7/2/31.**

Hull 249, same as above; keel 1/17/31; launched 3/16/31; **delivered 7/2/31.**

Hull 250, dredge for Sternberg Dredging Co.; 150 x 50 x 7'10" depth; keel 3/21/31; launched 6/3/31.

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; **keel 6/26/31; launched 8/31/31.**

Hull 256, oil barge for stock; 140 L.B.P.; 26 beam; 8 depth; keel 6/4/31; **launched 7/20/31; delivered 7/25/31.**

Hull 257, same as above; keel 6/10/31; **launched 7/23/31; delivered 7/25/31.**

Hull 258, deck barge for stock; 100 x 26 x 6'6"; keel 8/10/31.

Hull 259, deck barge for stock; 100 x 26 x 6'6"; keel 8/18/31.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

President Coolidge, hull 340, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speed; keel 4/22/30; launched 2/21/31; deliver 10/31 est.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launched 8/15/31; deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 12/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 12/31 est.; deliver Mar./34 est.

Not named, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; deliver 5/32 est.

Not named, hull 351, sister to above; keel 9/31 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Not named, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/1/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 sectional express boilers; keel 10/31 est.

THE PUSEY & JONES CORP.,
Wilmington, Del.

Purchasing Agent: James Bradford.

Jersey Shore, hull 1053, steel hull and steel superstructure for auto carrying ferryboat for Delaware-New Jersey Ferry Co.; 174'7" L.B.P.; 58 beam; 9'3" loaded draft, diesel machinery and other work by owners; keel 5/26/31; launched 7/30/31; delivered 8/31/31.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launch 12/1/31 est.; deliver 7/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; launch 10/1/31 est.; deliver 11/1/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31, launch 9/15/31 est., deliver 10/1/31 est.

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

Not named, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7'6" loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel 6/23/31.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; launch 10/1/31 est.; deliver 2/1/32 est.

Knickerbocker, hull 798, ferryboat for New York Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launched 9/1/31; deliver 10/1/31 est.

Hull 802, float, truss weld, for Jas. Stewart & Co., Inc.; 100 L.O.A. x 31 feet; keel 8/4/31; launch 9/4/31 est.; deliver 8/31/31 est.

News from the Ports

Million Dollar Harbor Job.—The Columbia Contract Company of Portland, Oregon, was low bidder when tenders were opened by the Portland United States Engineers Office for repair work to the south jetty at the mouth of the Columbia River. The job includes placing of about 700,000 tons of rock and construction of a tramway connecting with the railway at Fort Stevens. The low bid for the complete job was $1,204,606.19.

China Has Ten-Year Harbor Plan.—According to reports from China, the Ministry of Industry has outlined a Ten-Year Plan for the development of the agricultural, manufacturing, and commercial industries of China. The plan is outlined to embrace 14 points. The government feels confident that if these plans could be successfully worked out over a ten-year period a great era of prosperity will open up for the people of China and for the stabilization of the government. The 14 points are:

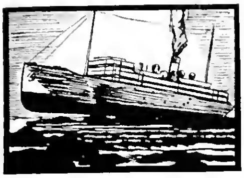
1. To build harbors, canals, railroads, etc.
2. To open up the vast area of undeveloped land in the northwest and generally improve the agricultural and pastoral industries.
3. To develop mines and quarries.
4. To erect smelting works and mills.
5. To produce iron and steel.
6. To manufacture bricks, cement, and other building material.
7. To build locomotives and rolling stock.
8. To build merchant ships and fishing vessels.
9. To manufacture vehicles of all types.
10. To promote the coal-tar industry.
11. To establish works for making basic chemicals.
12. To develop hydro-electric schemes and establish central power stations.
13. To manufacture electrical machinery.
14. To establish municipal waterworks undertakings.

It is obvious that this program will call for an enormous supply of machinery and for much engineering and executive talent.

To Erect Radio Beacons.—The Hydrographic Department of the Government of Uruguay, South America, has awarded a contract to the British Marconi Company for the erection of three new automatic wireless beacons. Two will be installed in lighthouses at Lobos Island and Cape Polonio, and the third on the English Bank light vessel. They are scheduled for operation in 1932.

Harbor Construction.—The Board of State Harbor Commissioners for San Francisco approved plans recently for the construction of a steel and concrete transit shed and dock on the site of Pier 23, to be 830 feet long and 111 feet wide. Cost is estimated at $150,000. In addition to this work, five piers, Nos. 14, 16, 18, 20, and 22, between Mission and Harrison Streets, are being raised from two to four feet. The gradual sinking of the artificial sea-wall upon which the substructures were built made this work necessary, and it will cost $200,000.

The Board has held a number of hearings and has investigated a number of sites for a proposed new state-owned, shipside cold storage plant for the San Francisco Bay district to provide refrigerated facilities for the fruits and vegetables originating in the San Joaquin and Sacramento valleys. Two sites in San Francisco, one in Oakland, and several in Stockton and Richmond have been proposed.



Marine Insurance

Edited by James A. Quinby

Dredgers Required to Signal in Fog

Federal Court Decision Holds Inland Rules Applicable to Dredgers

FOR many years, large clam-shell dredgers, bearing excavating machinery but without propelling power of their own, have operated in widening and deepening the channels of Pacific Coast rivers. The failure of such dredgers to comply with certain requirements of the Inland Rules has long been a bone of contention between their owners and the operators of river craft which are forced to pass them in tortuous channels.

On September 4, 1931, Judge A. F. St. Sure of the Federal District Court in San Francisco, in the case of Olympian Dredging Company vs. Steamer Pride of the River, handed down a decision which establishes a precedent of great importance to the navigators of western rivers. The case arose from a collision between the Pride of the River and the dredger Trojan on December 8, 1930, at a point near Ryde on the Sacramento River. The dredger, which was about to be used by her owners to complete certain work under a government contract, was moored for the night near the eastern bank of the 280-foot river channel. The place of mooring was selected by the United States Engineer in charge of the district; and the crew of the dredger, after placing proper lights upon the craft, turned in for the night, leaving no watchman on duty. A heavy tule fog set in about nightfall, and by 11:15 P.M., when the stern-wheel steamer Pride of the River came down the river from Sacramento, the visibility was so impaired that the lights on the dredge gave little or no warning of her presence. The navigators of the steamer did not know of the location of the dredge, and in making a bend in the river, with the dredge on their port hand, struck the dredge and caused damage which the dredge owners alleged to be in the neighborhood of $12,000. In the ensuing libel brought by the Olympian Dredging Company, it was contended that the steamer was at fault for excessive speed in the fog and for violation of Article 25 of the Inland Rules, which Article requires a vessel in a narrow channel to keep to the right-hand or starboard side of the center of such channel when it is safe and practicable to do so. The libelants further contended that the dredge was properly moored under the direction of a government officer and that as she had no motive power she was not a vessel and was not subject to Article 15 of the Inland Rules, which requires a vessel, when moored or at anchor, to ring a bell during foggy weather.

Santa Claus

Hail the insurer
 Who pays all his losses
Without taking refuge
 In warranty clauses—
Who covers all risks
 Upon mirrors in crates
And still underquotes
 His competitors' rates.
Deal with this chap
 While you can, for it's clear
He won't be in business
 After next year.

J. A. Q.

Dredge Held Solely To Blame.

After a four-day trial, the Court, in an oral opinion delivered from the bench, held that the failure of the dredge to make a sound signal in the fog was the sole cause of the collision. In addition to deciding definitely that a dredge is a vessel and as such is subject to the requirements of the rules of navigation, the decision inferentially holds that it is neither safe nor practicable to require a river steamer to keep to the right-hand side of the twisting narrow channel of the Sacramento River, unless such steamer has warning of the presence of other craft in the channel.

The Pride of the River was represented in the litigation by Derby, Sharp, Quinby and Tweedt of San Francisco, while attorneys for the dredging company were Messrs. Philip Angell and Carroll Single.

The salient points of Judge St. Sure's decision may be quoted as follows:

"As illustrating the condition of the weather on the night of the accident, I refer to the testimony of the captain of the Delta Queen, who testified that he left Sacramento before the Pride of the River, and that when he arrived at Ryde Station about eleven o'clock the fog was so dense that he had trouble at the bend after passing the station and collided with the trees on the right-hand bank, which collision resulted in the breaking of the windows of his vessel on the starboard side in front. The captain of the Delta Queen further testified that he saw the dredge when he passed it, drifting down the stream, but that he was only able to distinguish the white light, or a white light upon it, and he attributed his safe passage down the stream, or his slight accident that I have mentioned, to good luck; he said his safe passage was not due to anything he did, but rather to what nature did in carrying his boat down the river after he righted her in the channel. The evidence further shows that on the Pride of the River there was a lookout at the bow of the vessel, that there was a lookout in the pilot house, and that there were also in the pilot house the captain and the pilot.

The testimony of the officers of the Pride of the River shows that she was proceeding down the stream at moderate speed, picking her way, one might say, in the fog, and that suddenly directly in front, the pilot, the captain, and the lookout in the pilot house noticed a white light ahead; that immediately the signal was given to reverse, and the engine was reversed but the vessel came on slowly and struck the dredge. I do not think that there is any doubt but that when the Pride of the River struck the dredge she was moving very slowly; had she not been moving slowly she would have destroyed the dredge and probably taken one or more lives.

I think that Article XV of the Inland Rule applies to the dredge Trojan; that article provides, among other things, that 'in fog, mist, falling snow, or heavy rainstorms, whether by day or night, the signals described in this article shall be used as follows; i.e.,

'(d) A vessel when at anchor shall at intervals of not more than one minute ring a bell rapidly for about five seconds.' I think, as I have stated, that that rule applies to dredgers, and I think that the dredger should have had a warning bell upon it and should have been sounding that warning bell.

I am not so sure that the dredger had a right to moor in the channel where she did. It may be, as was suggested in one of the decisions cited by Mr. Derby, that the dredger was, in a sense, authorized to moor in the channel, but in this connection we must bear in mind that the captain of the dredger was not a navigator, and knew nothing about navigation; that the government engineer was not a navigator, and knew nothing about navigation. No one in charge of the dredger was competent to say where the dredger should tie up; that is to say, they were not competent to say that the place selected was a safe place in the river to moor the dredge, and from all of the evidence adduced here it seems that it was not. The dredge, we will remember, was in width 70 feet over all, and she was moored twenty feet from the bank, which shows that she occupied about 100 feet of the channel on the east side thereof.

I therefore find that the allegations in the libel charging negligence against the respondents are untrue. I further find that the libelant and its dredge, the Trojan, are solely to blame for the accident that happened.

So far as the cross-libel of the respondent is concerned, I find that the Pride of the River committed no negligence in the premises, and that the said collision and the loss caused thereby was solely due to the carelessness, neglect, and fault of cross-respondent, and the dredge Trojan. I find that the dredge was improperly moored in position in the navigable channel of the Sacramento River customarily and necessarily used by vessels proceeding both up and down said river, and was an obstruction and menace to navigation. I further find that although a dense fog prevailed, both before and at the time of the collision, such dredge was not then or at all ringing a bell as required by law, or at all, nor giving or making any warning signal whatever."

The Death of Jerry

We print herewith a letter written by the master of a Japanese freighter reporting the death of a family pet entrusted to his care. The writer's difficulty in expressing himself in a foreign language may strike the careless reader as ludicrous, but the letter is not reproduced for the amusement of such readers, but rather to draw attention to the depth of human sympathy displayed by the officers of the vessel. Had the vessel been of American registry, we fear that the only mention of the incident would have been a log notation reading "July 21—Dog died . . . . ."

"Re: Death of the dog shipped as cargo.

With profound regret, this is to advise you that one dog named Jerry, shipped at Los Angeles as cargo destined for your port, on this Voyage No. 12 out, died on the 21st inst. We were always very faithful, in obedience to the shipper's instructions, to look after the shipment. Notwithstanding, after we left the port of La Libertad, it went less vigorous and spiritual day by day, and even the daily twice strolling on board the deck with crew's attendants seemed not so much delightful task as used to be. And such inauspicious conditions of the animal appealed much to the sympathize of the all on board; truly, the medical treatment of the doctor on this steamer, therefor, has positively been applied for a long time since with care, as if it were a human being, or still more, but in vain.

Thus, to our great disappointment, contrary to the hope of the improvement, the pretty dog died, but, without pain, to be sure, like to fall in asleep.

As to the above, we cabled from this port as follows: 'Dog Jerry died on account of sickness. Advise consignee,' which we beg to confirm and thank you for your trouble, and further you are informed that the corpse of the animal were buried at sea on the 22nd, position at Lat. 16-17, S., Long. 75-54, W., after it was snaped into camera, which photo copies are enclosed herewith in the proof of the facts and for your reference.

Yours faithfully,
Master."

Repairman's Liability Coverage Defined

IN the recent case of the Faith, 1931 A.M.C. 1250, the Court of Appeals of the State of New York had before it the interpretation of the policy issued by the Northwestern Fire and Marine Insurance Company covering the Marine Basin Company for their liability in connection with "any vessel or vessels that may be in charge of the Marine Basin Company, especially in their floating dry-dock and/or their Marine Railway situated at Brooklyn, N.Y., as below:

"Underwriters to cover only the assured's legal liability for any and all losses (up to the amount of this policy) which may occur on vessels injured or damaged while in the assured's charge being altered and/or repaired by the Marine Basin Company at their shipyard, whether in dry dock or on marine railway or not, but this policy is not liable for any losses which can be collected under other policies of assured, nor under policies held by owners of vessels unless there is recourse against assured.

"It is understood that in the event of loss under this policy the assured can recover from the underwriters for work without first having recourse to the owners.

"To pay only the excess of $100 each claim.

"Warranted no claim for personal injury to, or death of, any person or persons under Workmen's Compensation Acts or otherwise. (Attached to and forming part of policy No. 4387 of the Northwestern Fire & Marine Insurance Company)."

The policy further contained the words "with privilege to lay up and make additions, alterations, and repairs, and to go in drydock."

In June, 1924, the owners of the Faith arranged with the Marine Basin Company to tie the boat up at one of the latter's wharves at a rental of $35 per month. In October, 1925, the boat was sunk owing to the negligence of the Marine Basin Company in failing to furnish safe dockage. The present action is filed by the Marine Basin Company to recover under their policy.

In holding the insurance did not cover the Faith, the Court commented as follows:

"The plaintiff contends that the language used in the policy means that the insurance was to cover boats 'laid up' as well as boats laid up for the purpose of making repairs; also that the boat Faith, at the time it sank, was 'in charge of' the plaintiff 'being altered and/or repaired,' within the meaning of the words of the policy. We have reached the conclusion that the plaintiff is wrong in both contentions.

"Insurance policies 'must be given a fair and reasonable interpretation to cover the risks which the parties had reason to anticipate, and had reason to believe would be met by the policy' (Underwood vs. Globe Indemnity Co., 245 N.Y. 111). Guided by that principle, it must be held that a fair reading of the policy in question clearly shows that it was intended to cover 'only' boats 'while in the assured's charge being altered and/or repaired.' The boat Faith was not in charge of the plaintiff and was not being altered or repaired by it. Its owners had rented dockage space of the plaintiff at $35 a month rental. The boat had been tied up in the space rented in charge of a watchman employed by the owners. From time to time from June, 1924, it had been taken out by the owners and used and then brought back and tied up to the dock in charge of their own watchman. In order to permit a recovery we must hold that the policy covers all boats tied up at the plaintiff's

REINSURANCE AND NET INSURANCE

	1929	1930
Insurance Premiums Reported:		
By American companies	$67,256,000	$60,069,000
Reinsurance (deduct)	21,477,000	19,754,000
Total American premiums	$45,779,000	$40,315,000
By Foreign companies	$30,537,000	$25,300,000
Reinsurance (deduct)	15,874,000	14,875,000
Total Foreign premiums	$14,663,000	$10,425,000
Total original premiums - American & Foreign	$60,442,000	$50,740,000
Cargo Premiums Reported:		
By American companies	$41,803,000	$33,468,000
Reinsurance (deduct)	14,671,000	12,560,000
Total American Cargo Premiums	$27,132,000	$20,908,000
By Foreign companies	$22,209,000	$16,770,000
Reinsurance	11,122,000	9,382,000
Total Foreign Cargo premiums	$11,087,000	$7,388,000
Total Cargo premiums	$38,219,000	$28,296,000
Hull Premiums Reported:		
By American companies	$25,453,000	$26,601,000
Reinsurance (deduct)	6,806,000	7,194,000
Total American Hull premiums	$18,647,000	$19,407,000
By Foreign companies	$8,328,000	$8,530,000
Reinsurance	4,752,000	5,493,000
Total Foreign Hull premiums	$3,576,000	$3,037,000
Total Hull premiums	$22,223,000	$22,444,000
GRAND TOTAL CARGO AND HULL PREMIUMS	$60,442,000	$50,740,000
Reinsurance with Foreign Non-Admitted Co's.	$8,696,000	$6,538,000
NET PREMIUMS WITHIN UNITED STATES	$51,746,000	$44,202,000

American Marine Insurance Business, 1929 and 1930.

dock, in space rented from the plaintiff for the purpose, even though not in charge of the plaintiff or being altered or repaired by it, or laid up in its charge for that purpose. The evidence does not permit such a holding."

Mixed Cargo

Advices from Italy indicate that the new Italian maritime code will bring that country into line with the York-Antwerp Rules by providing that the contributory value of vessels in general average shall be the actual value at the termination of the adventure, instead of fifty per cent. of such value, as required by the existing Italian law.

The change will meet with the hearty approval of everyone involved, save possibly the hull underwriters on Italian ships. Under the existing law, Italian adjusters have been forced to exact extremely high deposits from cargo owners in general average cases, to cover the relatively high proportion of contribution expected from cargo due to the reduced contributory value of the hull.

Whenever a question arises involving the interpretation of some obtuse and voluminous insurance policy, we are reminded of Lonnie Follansbee's story of the delta landowner who wanted insurance against overflow of the river, but couldn't understand the lengthy policy presented for his approval.

"I don't want any policy," he said. "All I want is a chit saying they bet me 'steen thousand dollars to umpty thousand that she don't overflow."

Might not be a bad idea, at that.

When the liner Prince David stranded recently, her owners received the following confident epistle from a would-be salvager:

CANADA STIMSHIP CO.
Seattle,
Wash.

Gentleman:

I have read in the Time about S. S. Prince Davit. I am a student of Marin Disasters and my hop is som day to do what i can to put a stop to it by making som improwment I think is nidet, and you would do mee a great favor if you would tell me what you think af the fallowing regadles what it is.

If I was to to get that boat back in the water a Dig a DITCH UNDER and back af then so then would flot an high water.

I have a 20 H.P. gas donkey as I could do it with.

If thes is not the adr. (Canadastimship Co.) pleas send it to the rith parti.

Yours truly."

Harry W. Browne, well known San Francisco marine underwriter, has announced his resignation as marine department manager of Charles Brown & Sons. Mr. Browne has become affiliated with the marine general agency firm of H. J. Knowles, Ltd., of San Francisco.

Freights, Charters, Sales

September 18, 1931

THE Japanese stmr. Cape Town Maru has been fixed with wheat from Portland to U.K./Continent, 22/-, Oct., by Balfour, Guthrie & Co.

The following steamers have been fixed with grain to the Orient: A Steamer, Portland to Shanghai, \$3, Oct., Arnhold & Co.; British stmr. Madras City, Columbia River to Shanghai, \$3.10, Sept., Wood Baxter & Co.; A Smith steamer, Portland, Puget Sound to Shanghai, \$3.10, Oct.; A Smith steamer, Portland, Puget Sound to Shanghai, \$3.10, Nov.; Norwegian m.s. John Bakke, Columbia River to Shanghai, \$3, Sept., Wood Baxter & Co.; A Japanese steamer, Vancouver, B.C., to Shanghai, \$3, Oct.; A Japanese steamer, Vancouver, B.C., to Shanghai, \$3, Sept.; British ms. Santa Clara Valley, Portland to Shanghai, \$3.10, Nov., Yamashita Shipping Co.; British stmr. Vernon City, Portland to Shanghai, \$3.10, Oct., Yamashita Shipping Co.; Japanese stmr. Yojin Maru, Portland to Shanghai, Oct., \$3.15, Mitsui & Co.; Danish ms. Stjerneborg, North Pacific to Shanghai, Oct. (relet).

The following steamers have been fixed with lumber to the Orient: British stmr. City of Victoria, Deep Bay, B.C., and Puget Sound to Yokohama and Osaka, Aug., Canadian American Shipping Co.; Japanese stmr. Seisho Maru, Grays Harbor to Japan, Sept., J. W. Allen, Inc.

The Swedish ms. Pajala has been fixed with wheat and lumber from British Columbia to Shanghai and Japan by Canadian American Shipping Co.

The following steamers have been fixed with lumber to the Atlantic: American stmr. Jefferson Myers, Grays Harbor to United States port north of Hatteras, Sept., Transcontinental Lumber Co.; American stmr. Edwin Christenson, Grays Harbor to United States port north of Hatteras, Sept., Transcontinental Lumber Co.; American stmr. San Diego, North Pacific to United States port north of Hatteras, Sept.,

A. C. Dutton Lumber Corp.; American stmr. Frieda, Puget Sound to New York, Sept., A. C. Dutton Lumber Corp.

The following time charters have been reported: British ms. Bonnington Court, 3 to 5 months, delivery U.K. Continent, redelivery U.K.-Continent, via North Pacific, 90 cents, Aug., H. R. MacMillan Export Co.; American stmr. Mary D, 1 trip intercoastal, delivery Puget Sound, Strange & Co.; Danish ms. Tacoma, Pacific trade, delivery United States north of Hatteras, 1 North Pacific round, $1.00, Aug.; A motorship, delivery North Pacific, redelivery United States port north of Hatteras, 95 cents, Sept.; Swedish motorship Nuolja, 4 to 7 months, delivery West Coast, redelivery U.K., Sept., Canadian American Shipping Co.; Danish ms. Indien, 4 to 6 months, delivery and redelivery U.K./Cont., via North Pacific 87½ cents, Sept., Canadian Transport Co.; Danish ms. Nordkap, Pacific Trade delivery North Pacific, redelivery North of Hatteras, 95 cents, Sept.; Danish ms. Asia, North Pacific to China, $1.45, Sept., Canadian American Shipping Co.; Swedish ms. Sveadrott, British Columbia to Shanghai, prompt, Canadian American Shipping Co.; Danish ms. Australien, North Pacific to Shanghai, lumber and wheat, Oct., Canadian American Shipping Co.; A ms., 4 to 6 months, delivery Vancouver, B.C./Portland range, redelivery U.K./Continent, $1.30.

PAGE BROTHERS, Brokers.

Scoville Alcunic a New Condenser Tubing

A NEW condenser tube alloy, sold under the trade name Alcunic, has been developed by the Scoville Manufacturing Company.

Alcunic is an alloy of copper, nickel, aluminum, and zinc, having a golden yellow color, remarkable physical properties at both ordinary and elevated temperatures, and a very high resistance to general corrosion. This combination of properties, together with its resistance to air impingement attack, makes it an ideal condenser tube metal. The approximate composition of Alcunic is 80 per cent. copper, 2 per cent. aluminum, 1 per cent. nickel, and 17 per cent. zinc.

Alcunic can be successfully hot pierced, extruded, and cold-worked. From the standpoint of greater strength, low yield point, high elongation, and its excellent resistance to salt water corrosion and corrosive solutions met with in marine service, Alcunic is superior to other copper-aluminum-zinc alloys now being marketed for condenser service.

It is claimed that Alcunic possesses all the advantages of the copper-aluminum-zinc alloys developed in Europe for condenser tubing and eliminates the disadvantages having less tendency to season crack and no tendency to split or crack when being rolled into the sheet.

Obituary

BRUCE FORD, 58, inventor and engineer, died August 10th at his home, Boxwood, Chestnut Hill, after a brief illness following several years of poor health. He was second vice president and a director of The Electric Storage Battery Company, 19th street and Allegheny avenue, and until recently general manager of the company.

Mr. Ford was long recognized as one of the leading engineers in his field and was at one time regarded as its outstanding authority. His inventive faculty was highly developed, and he obtained more than eighty patents.

DR. C. E. WINTERMUTE, surgeon on the Dollar Line steamship President Jackson, died at sea September 2 and was buried in the Pacific between Balboa and Los Angeles. He died of heart disease. Dr. Wintermute was 60 years of age. He is survived by his widow and children living in Oakland, California.

Well known for the past quarter of a century in the marine insurance circles of San Francisco, and a veteran of California and Montgomery Streets, H. D. "HUGH" ALSTON, 68 years old, died at his home 1001 Pine Street, on August 21. Just prior to his death he was manager of the cargo department of Johnson & Higgins.

ALBERT W. LAWSON, well known marine surveyor, engineer, and designer, of Seattle and San Francisco, died in Seattle, September 9, after an illness lasting several months. Prior to opening offices ashore, Mr. Lawson served for many years on various ships, including vessels of the American-Hawaiian fleet.

Another old-time ship master has passed to his reward. CAPTAIN JOHN E. ANDERSON, who sailed up and down the Pacific Coast for forty years, died early in August at St. Luke's Hospital, San Francisco, at the age of 76 years. He left Sweden as a boy in the old sailing ship days. He is survived by his widow, Mrs. Anna Anderson.

This exhibit of Manila cord, Manila rope, and Manila Supercore Cable was a prominent and interesting feature in the San Francisco Harbor Day Parade.

Economics of Accident Prevention

By George F. Prussing
Union Oil Company of California

I DO not know what the title "Economics of Accident Prevention" means to the man who invented it, but to me it suggests that accident prevention is one of the most profitable ways in which a corporation can spend its money. If it were only possible in this business of accident prevention to pick out in advance those injuries which would cost large sums of money, and devote one's efforts to preventing these, what a wonderful showing the safety and fire prevention men could make.

I have in mind a tragedy that occurred at one of our distributing plants in the far west several years ago, where every one of the plant employees on duty at the time was killed in a fire which destroyed practically the entire plant and threatened destruction to the town in which it was situated. The fire occurred because a man replacing an outlet valve on a gasoline tank became impatient at the delay in receiving tank cars into which the station tank could be emptied. Having waited a day or so for the tank cars, he decided to wait no longer. He attempted to close the outlet to the tank by placing a sheet of rubber over it within the tank, and also by running four feet of water into the tank so that the leakage around his improvised closure would not be dangerous. Unfortunately, his trick device failed him at the critical moment and the tank emptied itself of the four feet of water before the valve could be replaced. The other employees at the station tried to help stem the flow with rags and other means, and in the scramble became saturated with gasoline. Finally the stream which had run out of the yard and down the railroad track became ignited from a neighboring switch lantern and men and station were consumed in a terrific fire.

Two years later the water draw-off valve on a similar marketing station tank, also adjoining a main line railroad, developed a serious leak. The local mechanic attempted to stop the leak by tightening the valve on its nipple. The valve cracked under this treatment and a gasoline leak as big as a man's finger spurted out toward the railroad track. The stage was all set for another disaster, but the actors in the drama had been given other roles. The men in this particular organization had, during the years between these two events, been given constant training in accident and fire prevention. It is interesting to see the effect that this instruction had in what followed. A long-distance telephone call reported the event to the nearest district office. Instructions were given to make no further attempt to work on the valve, but to catch the leakage and to get it into drums as quickly as possible. A call to the nearest police station and fire department brought men out to prevent passersby from getting too close to the leak. Another call to a producing camp forty-five miles away started the company's own foam chemical apparatus toward the scene of the accident. Two skilled mechanics in a fast car were dispatched from a nearby job where they had been reached by telephone. Tank trucks and trailers of sufficient capacity to take the 10,000 gallons of gasoline in the tank were gotten under way. The railroad was notified and advised to keep its switch engine off the adjoining track.

Within half an hour after the first call was received, the two mechanics had arrived on the job, and by the liberal use of yellow soap and bandages had cut the leak down to insignificant proportions. Fresh dirt was thrown over the ground that had become wet with gasoline. In another half hour the trucks and trailers arrived, and the emptying of the tank commenced. Soon the chemical fire apparatus arrived to stand by for the balance of the night. By midnight the tank was empty. A new valve soon replaced the one that was damaged. By morning all was again serene. The gasoline was back in the tank and the plant was operating as usual. There had been no fire, no personal injuries, and the cost of preventing the total destruction of the plant and the possible death of several men had been less than $300.

There you have the contrast between the actions of untrained and trained men in time of emergency. Safety Consciousness is but the ability to foresee consequences, plus the desire to prevent trouble. It costs money to instill it into men's minds. But look at the return on the investment!

We used to have a frequency rate for lost-time accidents in producing operations in this country of about 50 per million man hours. That meant that each year one man out of eight had a lost-time accident. Now we have found that we can operate, under normal conditions, with an accident frequency rate in the field of 30 per million hours. This rate is given in the figures published by the National Safety Council for 1930, which cover more than 45,000 oil workers in the drilling and producing fields of this country. The difference between those two rates represents a direct saving on lost-time accidents alone for the 45,000 men reporting to the National Safety Council of more than $500,000. What the producing division saved by the corresponding reduction in small injuries, I do not know, but would safely estimate at another $500,000 per year. Nor do I know what it cost to achieve this saving, but among the thousand men employed in our field department we estimate the reduction in accident rate showed a saving last year of not less than $25,000 over 1926, at a cost of less than $10,000. Where in this business, and especially in these times, can you get a greater return on your investment?

In a recent talk, Mr. Ferguson, president of the Newport News Shipbuilding and Dry Dock Company, stated that his company had actually earned more than $1,000,000 in the past ten years from self-insurance. They have in those years cut their accident rate some 75 per cent. Every injury avoided has meant arms and legs to some man in their employ, and some hundreds of dollars saved to the company. I can say the same for the company for which I work. Our saving from accident prevention in those states where we are legally permitted to self-insure is more than $100,000 per year.

There is no employer so hard-boiled who would not rather spend his money to prevent an accident than to compensate one. Give him the opportunity, and show him the way, and the average employee will support the movement with his whole heart. It is a short-sighted policy to estimate the initial expense of protecting men as a lost cost. Usually it is ultimately a cost saver.

—California Safety News.

Pacific Marine Personals

AFLOAT AND ASHORE — BY PAUL FAULKNER

Captain G. B. Wait, who went out on the Malolo, September 19, as executive officer. This is Captain Wait's third Round-Pacific cruise on the Malolo.

CAPTAIN R. C. BRENNAN, superintendent of the Oceanic Terminals at Portland, and Miss Nanomi Willis of Hood River, Oregon, were married quietly last month at the bride's home, but the news took only a week to leak out, and Captain Brennan has been receiving the sincere congratulations and best wishes of his friends.

The LASSCO coastwise line serving the Pacific Coast ports of San Diego, Los Angeles, and San Francisco, is now operating on the strenuous service of a sailing six days a week with only two steamers—the Yale and Iroquois. In order to give the captains some respite from this hard schedule, RALPH J. CHANDLER, vice-president and general manager of the line has announced a rotating schedule for the skippers. CAPTAIN GEORGE H. ZEH, CAPTAIN FRANK A. JOHNSON, and CAPTAIN B. W. LEEK will each alternate taking a vessel for two weeks, spending the third week ashore.

A unique celebration was held in Seattle the last day of August when the Nippon Yusen Kaisha held a dinner on board the motor liner Hikawa Maru, with CAPTAIN G. S. LAPRAIK of San Francisco as guest of honor. The dinner was in celebration of the first N.Y.K. ship in Seattle, the Miike Maru, commanded by Captain Young, of which Captain Lapraik is the only surviving officer. The Miike Maru established the first Japanese service between the Orient and Seattle in 1896.

Chief Engineer Benjamin Lockett of the intercoastal passenger vessel El Salvador. Chief Lockett has a very fine record as an engineering officer and is said to be the best dancer on the P-M engineering staff.

Young men of California who have graduated from high school, between 17 and 21 years of age, and who are ambitious to fit themselves for a life career in the merchant marine may take admission examinations on October 2. The headquarters of the California Nautical School are at Tiberon, on San Francisco Bay. The school is part of the State Department of Education.

Friends of W. E. DOOLING, assistant manager of the American-Hawaiian Steamship Company, at San Francisco, were grieved to hear of his injury and the injury and resulting death of his wife in an automobile accident on Labor Day. According to latest reports, Mr. Dooling was greatly improved.

HOWARD TRUSLOW has been appointed assistant passenger traffic manager for the Panama Mail Steamship Company, with headquarters at San Francisco, according to an announcement by W. A. YOUNG, Jr., general passenger traffic manager. Mr. Truslow's efforts will be devoted to the development of new travel business between California ports and New York via Mexico, Central America, Panama, Colombia, and Havana, confining his scope to the western states. He has been engaged in railroad and steamship transportation activities for the past thirty years and was with the Los Angeles Steamship Company from 1921 until his present appointment.

O. O. BRITTON, paymaster on the Matson flagship Malolo for the last several years, has been promoted to position of purser on the steamer Manoa of the same line, according to a recent announcement.

D. C. HILLIS, former purser of the Manoa, and who also served aboard the Wilhelmina, has been assigned to an office job at the San Francisco headquarters of the company.

Captain E. R. Johnson and his command, the Matson liner Wilhelmina, make up one of the most popular teams in the San Francisco-Honolulu service.

Official News *of the* PROPELLER CLUB *of* California

Fall Golf Championship

THURSDAY, OCT. 15, 1931

at

Union League Golf and Country Club

MILLBRAE, CALIFORNIA

Chairman Russ Pratt announces that $4.00 covers green fees, wide open chances on thirteen valuable and beautiful trophies, and a gala banquet in the evening.

Louis K. Siversen is the defending champion, but being busier than ever these days, he is reported slightly off form, thus leaving the gate open.

Jim Cronin has figured out that 18 straight sixes, without pressure, will be in the winning list. No fives or nines; just even sixes.

Frank Fox, of General fame, is in training. Watch him closely.

Harry Haviside has taken his swing apart, following analysis by his motion picture department. The reassembly should be a masterpiece.

Bert Anderson has been in a list of important tournaments schooling himself for our fall classic.

Eddie Martin, Vernon Showell, Bill Empey, Ralph Myers, Flet Monson, Frank Depue, Phil Coxon, Ed Egbert, "Dad" Le Count, John Parker, Fred Kobely, and Millard Hickman are all long shots to finish out in front.

Each of these students of the royal and ancient pastime has been either taking lessons, practicing at length, or reading text books. One or two of them have been going all over town watching Bobby Jones' simple remedies on the screen.

About the busiest man on the San Francisco waterfront last month was PERRY OTTESEN, port steward and purchasing agent for the Matson Navigation Company. The occasion was the victualling of the de luxe liner Malolo for her annual Round-the-Pacific cruise which is to take the vessel on a 90-day cruise touching at 19 ports in 14 countries in the Orient and South Pacific.

As this is a de luxe cruise and as fresh foods and even fresh water are uncertain quantities in many of the ports of call, full provision for this long voyage must be carefully worked out in advance, either stored in her holds or ordered by cable at the ports of call. While a big task, Perry Ottesen and his efficient staff handled the job most efficiently, and the Malolo sailed on her transpacific voyage September 19 and will return December 16.

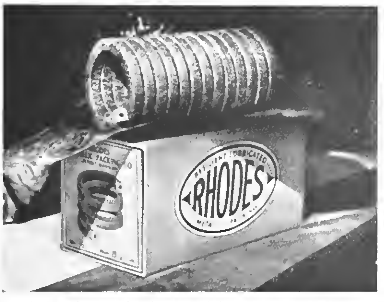
Fifty-seven hale and husky young Californians in training as future officers on the American merchant marine have been enrolled in the CALIFORNIA STATE NAUTICAL SCHOOL and are being given instruction and training at the shore station while waiting eagerly for their first cruise on the new schoolship California State now being prepared for their use at the Union Plant of the Bethlehem Shipbuilding Corp., Ltd.

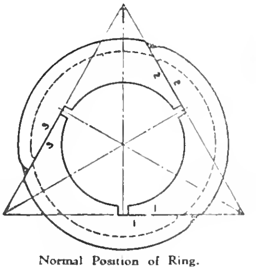
Chief Engineer Ernest F. Prince, head of the engineering staff of the Panama-Pacific liner Virginia and one of the most popular officers in the Intercoastal Service.

These cadets are receiving a specialized education covering mathematics, navigation, seamanship, ship construction, physics, engineering, electricity, ship economics, business practice, maritime and admiralty law, business English and at least one foreign language.

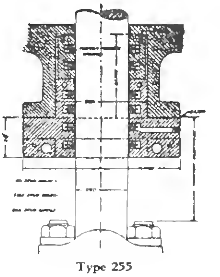
We have had the privilege of scanning the courses of study and the examination tests and they are both practical and thorough. That the young men have passed these tests to date with a fairly high average rating is eloquent testimonial to the competent instruction they are receiving and to their native ability.

Friends of FRANK BEW, for four or five years in charge of the San Francisco office of Thomas Cook & Son, bid him farewell with regrets when he was transferred to the Vancouver office of the Company some weeks ago. Mr. Bew originally opened the Vancouver office of the company in 1921 and remained there until about five years ago when he came to San Francisco to take the place of Charles Stokes, on the retirement of the latter. Bew is now returning to Vancouver and is being replaced at San Francisco by W. J. WILSON of the New York office.





Normal Position of Ring.



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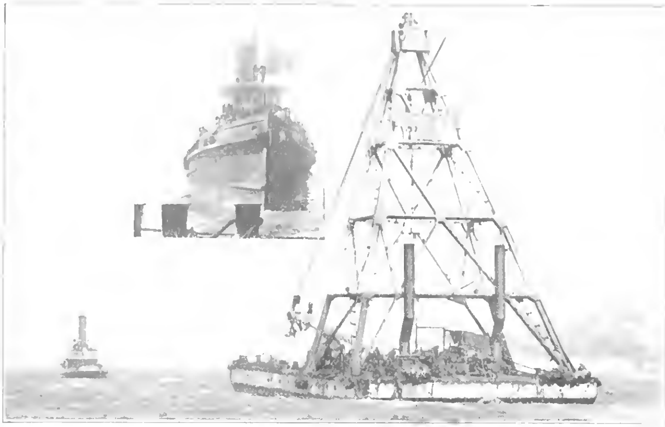


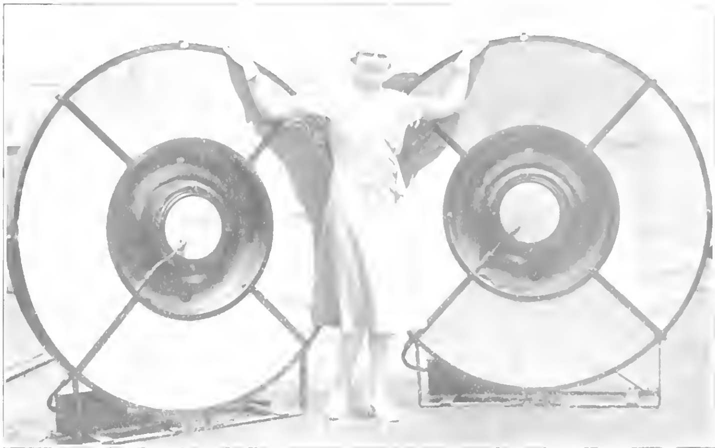
Propeller Club of California

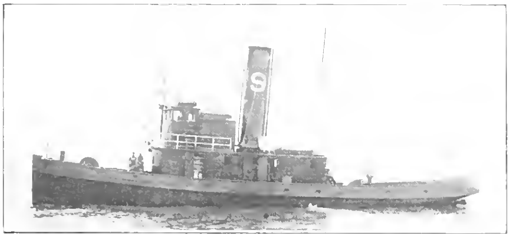
in cooperation with the San Francisco Junior Chamber of Commerce, makes Harbor Day Boat Races Notable Success

Above is gigantic Haviside Derrick Barge No. 4, base of operations for the exciting races. Inset shows the big tug Sea Ranger with crowd of officials aboard.

To right we show the winning crew from the Standard Oil Company (Calif.) tanker District of Columbia. In center is A. C. Rogers, coxswain; and port to star'b'd are: J. R. Suarez, V. G. Ivanoff, C. J. Delaney, C. A. Pavia, H. R. Kroetzch, W. A. Sattel, L. H. Fry and I. C. Tolin.

Stalwart crew from Standard Oil Tanker wins lifeboat race. Haviside Barge base of operations off San Francisco Marina





At left is the Standard Oil Company (Calif.) tug Standard No. 1, which towed the Haviside Barge No. 4 in the Harbor Day parade and stood by during the racing activities handling judges and officials. Above, a fair racing fan gives us an idea of the size of the special amplifiers used in broadcasting the water contests.

Below we see George Potter, Jr., of the Automatic Amplified Music Company operating the ultra-modern sound amplifier.

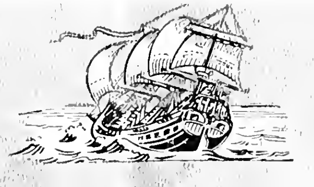
Above are Messrs. Post and Gatty of long-flight fame, guests of honor aboard the No. 4. To left is a view of No. 4's deck, showing arrangement of automatic sound amplifier.

1932 WILL OPEN A NEW ERA IN PACIFIC MARITIME SUPREMACY

Pacific Marine Review

NOVEMBER, 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION



Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

Pacific Marine Review, Vol. 28, No. 11, Published Monthly at 500 Sansome Street, in San Francisco. Entered as second class matter at the post office of San Francisco under the act of March 3, 1879.

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII — NOVEMBER, 1931 — NUMBER 11

Contents

Official Organ Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

Entered as second class matter June 20, 1913, at the postoffice, San Francisco, under the Act of March 3, 1879. Published on the 25th of each month preceding the publication date. Advertising and editorial forms close on the 15th. Subscription price, a year; domestic, $2; foreign, $3; single copies, 25c.

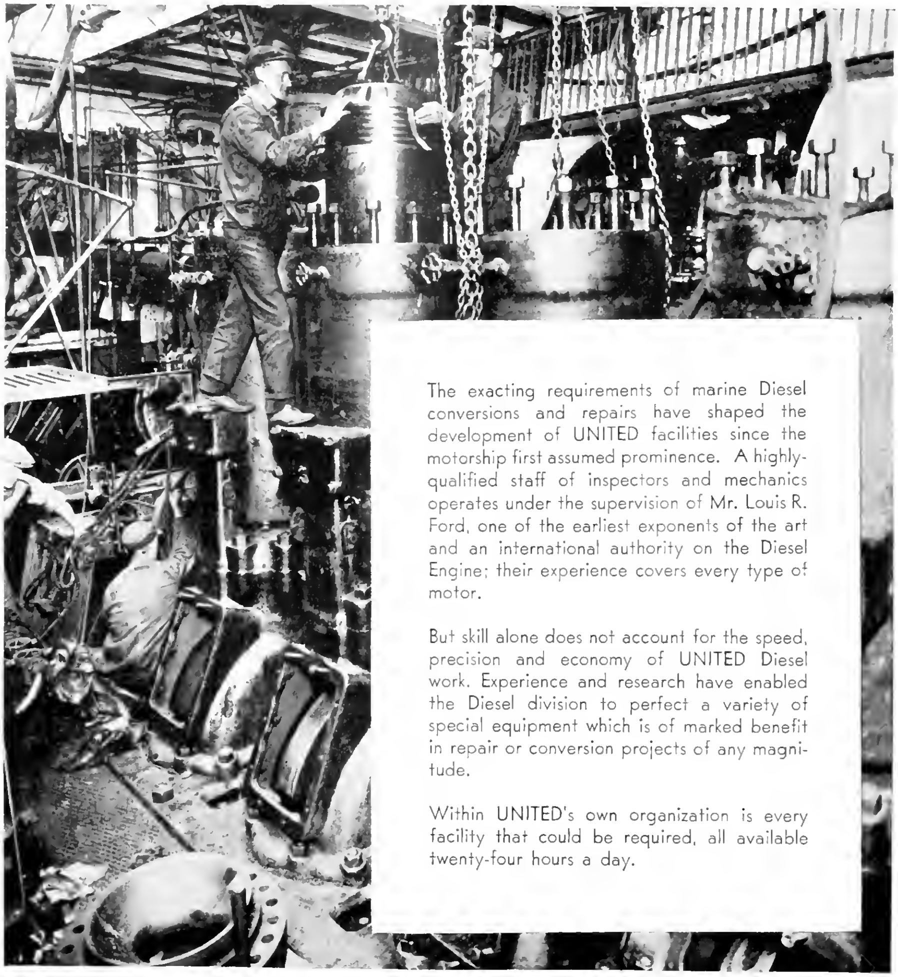
Official Organ Shipowners' Association of the Pacific Coast

Alexander J. Dickie, Editor.

Paul Faulkner, Advertising Manager.

Chas. F. A. Mann, Northwestern Representative, 1413 Puget Sound Bank Bldg., Tacoma, Washington.

Expert Diesel Service
Exceptional Diesel Facilities



The exacting requirements of marine Diesel conversions and repairs have shaped the development of UNITED facilities since the motorship first assumed prominence. A highly-qualified staff of inspectors and mechanics operates under the supervision of Mr. Louis R. Ford, one of the earliest exponents of the art and an international authority on the Diesel Engine; their experience covers every type of motor.

But skill alone does not account for the speed, precision and economy of UNITED Diesel work. Experience and research have enabled the Diesel division to perfect a variety of special equipment which is of marked benefit in repair or conversion projects of any magnitude.

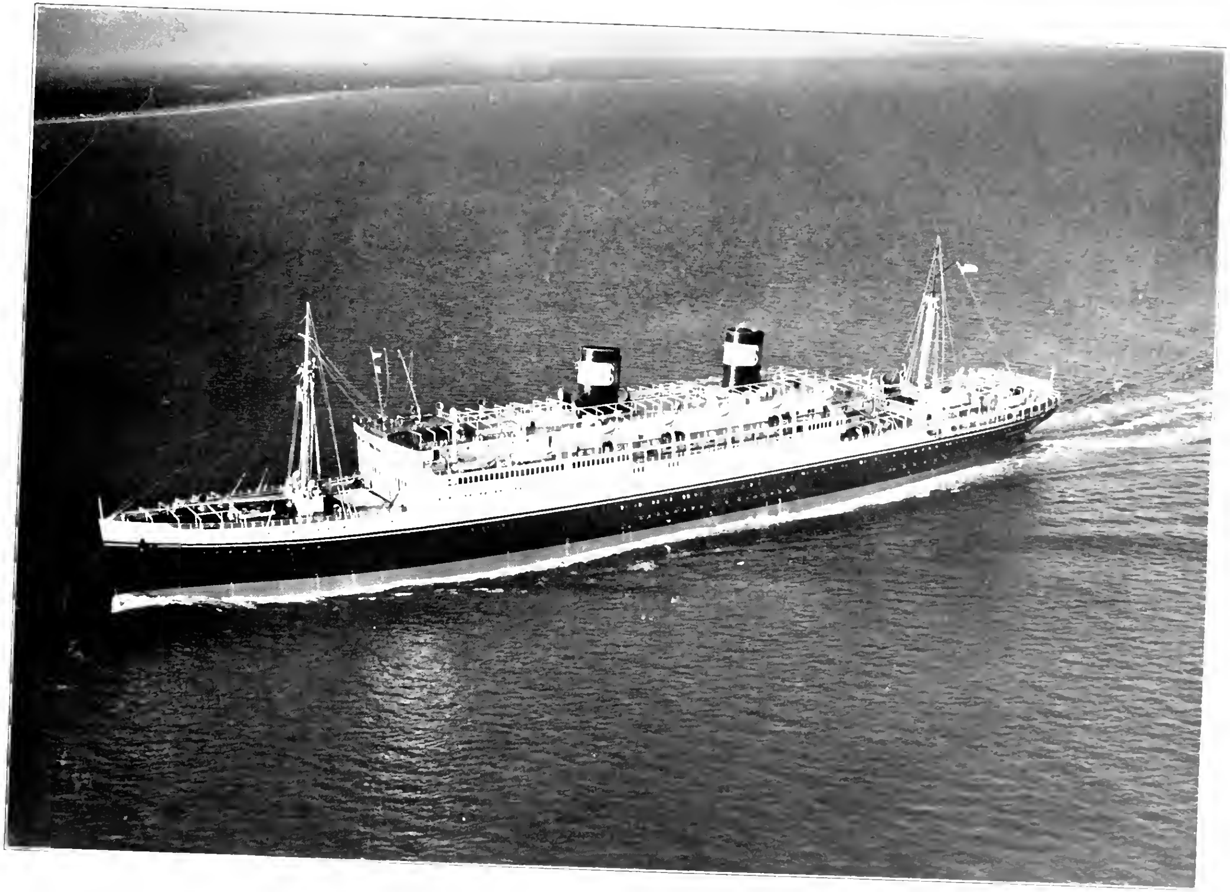
Within UNITED's own organization is every facility that could be required, all available twenty-four hours a day.

▼ ▼ ▼

Main Office
11 Broadway,
New York

UNITED DRY DOCKS
INCORPORATED

Staten Island
Fletcher, Morse
Crane Plants

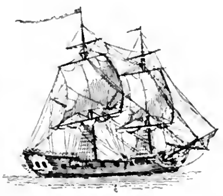


Aeroplane View of Dollar liner President Coolidge off Cape Henry

Pacific Marine Review

VOLUME XXVIII NOVEMBER, 1931 NUMBER 11

Editorial Comment » » »



Merchant Marine Combination

RECENT conferences held in San Francisco discussed a gigantic combination of American shipping interests to effect "cooperation between Pacific and Atlantic shipping groups for the general strengthening and protection of the American Merchant Marine in the sea lanes of the world."

These conferences were between Robert Dollar, Stanley Dollar, and Herbert Fleishhacker of San Francisco; Kenneth R. Dawson of Portland, Oregon; Paul W. Chapman, John M. Franklin, Kermit Roosevelt, and Cletus Keating of New York. The Dollars and Fleishhacker represent the Dollar world-wide steamship operation interests; Dawson represents large Portland shipping and financial interests; Chapman represents the United States Lines; Franklin and Roosevelt represent the I.M.M.-Roosevelt interests, Keating being their attorney.

It will be seen at once that here are the largest Atlantic Coast intercoastal and foreign trade ship-operating group and the largest Pacific Coast intercoastal and foreign trade ship-operating group meeting to try and arrive at some mutually satisfactory solution to the problem presented by the present disposal and future operation of the fleets now managed by the United States Lines. After considerable discussion, the conference agreed on a tentative program embraced in the following five essentials:

1. Acquisition by the Dollar-Dawson-Chapman group, backed by the Fleishhacker interests, of half ownership in the Roosevelt Steamship Company.
2. Taking over of the United States Lines fleet by the newly organized United States Lines Company.
3. The United States Lines Company, to be owned jointly by the Dollar-Dawson-Chapman group and the Roosevelt Steamship Company interests.
4. Intercoastal services of the Dollar Steamship Lines and the Panama-Pacific Line to be continued with non-conflicting schedules to be worked out to avert overlapping.
5. The fleet of the United States Lines to be kept in Atlantic waters.

This program is now before the United States Shipping Board and the executives of all the participating corporations for study.

The interests involved are tremendous. If such a program becomes an accomplished fact, the resulting merger will control one of the world's two or three greatest combinations of cargo and passenger tonnage. Such a combination could do much to stabilize the rate structure and rationalize the operation of the marine transport industry.

The American Merchant Marine, young, strong, and ambitious, needs for its further development more passengers on deck, more cargo in the hold, and more faith in our ability to handle a reasonable share of our foreign commerce without the help of any other nation.—

T. V. O'Connor.

Modern Seagoing Merchant Tonnage

FIGURES which relate to vessels each of 100 gross tons or over owned throughout the world on July 1, 1931, reveals the fact that out of a total seagoing tonnage of 10,356,077 gross tons under American ownership, no less than 9,392,371 gross tons (or 90.7 per cent.) are ten years old or over.

The United States is far behind every other principal maritime nation in the construction of modern tonnage. During the past five-year period only 5.7 per cent. of the United States seagoing tonnage has been constructed as compared with 33.8 per cent. for Norway, 22.5 per cent. for Great Britain and Ireland, 20.9 per cent. for Germany, 13.6 per cent. for France, 12.9 per cent. for Japan, and 12.2 per cent. for Italy.

The attached table shows in a striking manner the small percentage of the United States seagoing tonnage which has been constructed within the past ten-year period.

Percentages Of Seagoing Merchant Tonnage Of Principal Maritime Nations Represented By Tonnage Which Is Less Than Ten Years Old

Germany	50.2 per cent.
Norway	47.9 "
Holland	45.3 "
Great Britain and Ireland	44.6 "
Denmark	40.4 "
France	33.2 "
Sweden	32.4 "
Italy	29.0 "
Japan	21.8 "
United States	9.3 "

Food for Thought

A SURVEY was made recently by Otto Baedeker & Associates covering reasons for failures, mergers, or discontinuances of business among firms or businesses advertising in various media. As published by The American Trade Council, this survey discloses a very interesting fact bearing on the importance of trade journalism. The figures show that "93.968 per cent. of the passe activities **did not** attempt to promote or stimulate their business through publicity in their particular trades publications or directories."

The survey included reports from 12,003 separate businesses covering eighteen months in sixteen major lines of merchandise, a spread large enough to indicate general trends in the present economic situation. Of these 12,003 businesses that failed, 11,279 gave no support whatever to their trade journals.

It is certainly true that a good trade journal is worthy of adequate support by the industry which it represents; and if we may generalize from this survey, we can safely assert that adequate support of such a trade journal is profitable for the industry.

I sometimes wish I were engaged in any other occupation than shipowning. It is obviously a most fascinating occupation, but at times the variety of problems with which it is beset becomes so bewildering that I verily believe a shipowner needs to know more than any other type of business man.—

Sir Frederick Lewis.

Assistance from the Coast Guard

SHIPOWNERS, Masters, Radio Operators, and others concerned:

The United States Coast Guard is maintained by the Government for the purpose of rendering assistance to vessels in distress and saving life and property at sea and along our coasts.

The Coast Guard makes no charge for its services to vessels in distress and will respond promptly to requests for assistance so far as the distribution and condition of its facilities will permit. However, it is not the purpose of the Coast Guard to compete with commercial enterprise in ordinary towing and salvage operations, but to confine its assistance activities, generally speaking, to cases of actual or potential distress.

Vessels equipped with radio and requiring assistance may obtain the services of the Coast Guard by transmitting a request on the international distress and calling frequency, 500 kilocycles (410 kilocycles on the Great Lakes), to "Any Coast Guard Unit" (Radio call NCU), or to any shore radio station addressed to "Coast Guard." Shore radio stations will forward to the Coast Guard all information regarding vessels requiring assistance unless such information is contained in a message specifically addressed elsewhere.

If the following information is included in the original request for assistance it will place the responsible Coast Guard officer in a position to determine immediately the types and number of vessels required to render adequate aid, thus greatly facilitating the work of the Coast Guard and avoiding any unnecessary delay in the dispatching of assistance.

1. Name, type, and nationality of vessel.
2. Position, course, and speed (including drift).
3. Nature of trouble and condition of vessel, sea, and wind.
4. Number of persons on board.
5. State whether or not Coast Guard assistance is requested.

In cases of extreme emergency, when an "SOS" is broadcast, it is requested that the following procedure be followed by the vessel in distress. Approximately ten minutes after transmission of the original distress message, transmit slowly, on the distress frequency, "MO" and own radio call for three minutes. This will enable Coast Guard vessels and stations in the vicinity to obtain direction finder bearings and accurately plot the position of the distressed vessel.

Coast Guard administrative offices are located as follows:

Boston, Mass.—Custom House—Hancock 3540.
New London, Conn.—State Pier—New London 5366.
New York, N. Y.—Custom House—Whitehall 4-2717.
Washington, D. C.—Treasury Annex No. 1—National 6400-667.
Norfolk, Va.—Custom House—Norfolk 2-6638.
Fort Lauderdale, Fla.—Sweet Bldg.,—Fort Lauderdale 31.
Mobile, Ala.—Custom House—Dexter 5812 or 314.
Sault Ste. Marie, Mich.—Post Office Bldg.—Saint Marie 132 or 602.
Seattle, Wash.—Jos. Vance Bldg.—Main 4464.
San Francisco, Calif.—Custom House—EXbrook 7494.

The telegraphic and radio addresses are "Coast Guard San Francisco," "Coast Guard Seattle", etc.

F. C. BILLARD,
Rear Admiral, U. S. Coast Guard
Commandant.

The outstanding lesson which the war has driven home to us is the value, both in peace and in war, of a prosperous deep-sea merchant marine.—

Admiral Gleaves.

Marine Propulsion by Diesel Engines

AT the National Oil and Gas Power Meeting of the American Society of Mechanical Engineers, held at Madison, Wisconsin, June 23, A. J. C. Robertson, of Fairbanks, Morse and Company, read a very interesting paper on Marine Propulsion by Diesel Engines. This paper reviews the present state of screw propeller design and approaches the problems of the marine diesel engineer from the over-all propulsive economy viewpoint. He finds a vicious circle. Engine speeds must be increased to cut down weights, increased shaft speed cuts down propeller efficiency. He concludes:

"Until comparatively recently it was easy for the diesel engineer to accept low propeller efficiencies and yet have an over-all economy much higher than in steamers, due to the small amount of fuel used, but steam engineers have realized the serious competition of the diesel and have made asonishing improvements in large steam plants above, say, 5000 brake horsepower, and there is no saying how much further they will go in improving fuel consumption. This new competition, the competition of high-pressure, high-temperature steam, makes it essential for the diesel engineer to seek propeller efficiencies at least equal to those available to steam turbine engineers.

Until something better than the screw propeller is invented, it means using the largest propeller or propellers that the dimensions of the ship will allow, always bearing in mind that propeller thrust drops very rapidly when the blade tips come near the water surface. A depth of water of at least 20 per cent. of the propeller diameter should exist above the propeller tips for maximum efficiency and thrust. The revolutionary speed should be such that pitch ratios exceeding 90 per cent. should be possible.

There appear to be only two ways to meet this steam competition; either the development of slow-revolution, long-stroke diesels especially for marine work, or the use of some form of gearing with high-speed diesels, either mechanical or electrical. For heavy freight ships of low power, the long-stroke diesel is able to show very good economy, but for vessels of relatively high power the diesel-electric or mechanically geared diesel is the logical way of development.

Diesel engines for merchant ships have, in the past, been heavier than reciprocating steam engines with their boilers for equal revolutions, and weight is the biggest limitation which any naval architect has to contend with. It has been stated that one ton added in the equipment of a ship involves an increase of five tons or more in the displacement of the completed ship if it is to perform the same duty. Extra weight means extra power for propulsion and extra fuel. The extra power and fuel weight, plus the added weight, necessitate a larger ship to float them, and this, in its turn, demands a heavier structure; and so the weights build up in an almost endless chain. In fact, it is possible sometimes to make large increases in the power of a ship and yet obtain a decrease in speed, the resistance increasing more rapidly than the power, due to machinery and fuel weight added.

For this reason, any development of diesel engines (other than increasing revolutions) which produces a light engine will be welcomed by ship owners everywhere, with this important proviso, that the machinery must be of the utmost reliability. The security of the owner's investment and the lives of his employees, as well as the profitable operation of his ship, depend absolutely upon this reliability, and this accounts for the well known fact that shipowners are a very conservative people.

Diesel-electric propulsion is the direction of least resistance for the engine builder of today, because he is doubtless already building his engines for the electrical production of power. Direct gearing, which has proved to be so successful for steam turbines, is also available for diesels, and with a 3 to 1 or 4 to 1 speed reduction the weight should be much less. With recently acquired knowledge of torsional vibrations it should now be quite possible to develop gears to meet any requirements, and these might even be built into marine diesel engines, as has already been done with gasoline engines. Unless diesel engineers are prepared to do further pioneering for the marine trade, they may wake up to find the splendid progress already made in the ship-propulsion business slipping away from them again.

Uncle Sam's overseas mail service transported 90,497,840 pounds of letters in 1930, and 44,000,000 pounds of parcel post.

Notes on Naval Architecture

Welding in Marine Construction.—Occasional, small, completely welded, rivetless barges and other classes of craft, and the increasing use of welding in certain parts of large vessel construction, have led to much speculation and some engineering analysis on the possibility or desirability of completely welded large vessels. It has been shown mathematically that, given a good run of steady construction, the shipbuilder could substantially reduce costs by a complete welding operation. The great difficulty lies in adequate inspection of finished weld. This difficulty will probably be solved by the introduction of an inexpensive and handy method of X-ray inspection.

Several large industries are now using completely equipped X-ray laboratories for the examination of castings, welds, and assembled machinery; and these laboratories are proving very profitable investments.

The perfection of a method for inexpensively transferring such laboratory inspection to work on the way in shipyards, in the field, or in small industrial plants is receiving considerable attention and will, no doubt, soon be accomplished.

Model Testing.—In connection with the design of the several super-liners for transatlantic service, considerable study is being given to the design of superstructures and upper hulls in regard to stream-lining for the elimination of wind resistance. Since the National Advisory Committee for Aeronautics has recently installed, at Langley Field, Virginia, a towing basin one-half mile long, equipped with a towing carriage for speeds up to sixty miles an hour, American naval architects should be able to get adequate windage tests of superstructure designs for fast liners.

Increasing the Draft of Cargo Liners.—Sir John Biles, a noted British naval architect who can always be depended upon to bring out some startling idea, ran true to form at the recent Paris meeting of the Institute of Naval Architects when he predicted cargo carriers with 60-foot draft. Sir John, figuring from the standpoint of the ship, itself, as a unit, shows that the costs of transportation at sea are a minimum with certain drafts and speeds for given lengths, and he shows that a 1000-foot long, 20-knot ship with 60-foot draft is far more economical than a shorter shallower slower vessel.

There are, of course, very few harbors in the world ready to take a vessel of 60-foot draft; and it would be a matter of great interest to know whether there is any one trade route that could profitably assemble and distribute at each end of the route the cargoes necessary to make such ships profitable. Profits in such case to be figured after taking care of harbor dues, stevedoring charges, and due proportion of capital charges for preparing the harbors.

We can have a strong American Merchant Marine only by using American flag ships.

—Harvey Firestone, President,
Firestone Tire & Rubber Co.

Electric

Machinery Installation on Steamship President Coolidge

By H. C. Coleman*

Captain J. A. Ahlin on the bridge of the Steamship President Coolidge.

THE steamship President Coolidge is exactly the same as the steamship President Hoover in regard to tonnage, dimensions, and cargo and passenger carrying capacity. The only difference of any consequence between the two vessels is in the machinery installation. The new Dollar liner is driven by Westinghouse turbine electric machinery, and the electric auxiliary generating sets and motors for auxiliary power applications were also furnished by Westinghouse.

The propulsion plant consists of: two 13,250-horsepower synchronous motors, each coupled directly to one of the twin propeller shafts; two 15,000-horsepower steam turbines, each direct-connected to one of the two alternating current generators; and a control unit for these machines. Auxiliary power is supplied by four 500 - kilowatt, direct - current, geared turbine generator sets. This machinery is all located in one engine room amidship. This engine room has two levels. The propelling motors, main and auxiliary condensers with their pumps and other auxiliary pumps are located on the lower level; the main and auxiliary turbine generator sets and the propulsion control unit are located on the upper level.

Main Turbine Construction

The main turbines are of the usual Westinghouse combined impulse and reaction type. The turbine and generator are connected by means of a solid coupling, thus forming a three-bearing unit with two bearings on the turbine and one on the generator. Each part of the set rests directly on the foundation built into the ship structure.

On the turbine rotor, a solid annealed carbon steel forging, are mounted two rows of impulse blades and 29 rows of stainless steel reaction blades. These blades are all secured to the rotor by means of specially shaped shanks fitting in grooves and by wedges. The reaction blades are lashed together in small groups. The impulse blades in the second row are held together in groups by a strip peened and silver soldered into a groove machined in the blade ends. This construction makes an extremely rigid rotor.

The turbine cylinder is split horizontally and vertically, the high pressure section being made of cast steel and the low pressure section of cast iron. This cylinder carries one row of impulse blading and 29 rows of reaction blading held in place in grooves by soft brass offset keys and by steel packing pieces, the blades being lashed together as on the rotor.

The turbine is supported at three points, thus determining its position in a single plane and eliminating possible distortion of the cylinder. A foot is cast integral with the cylinder base on either side of the exhaust, these feet resting on the foundation. The high pressure end of the cylinder base is supported on a short I-beam section, placed in a transverse direction. The web of this I-beam furnishes the necessary flexibility to allow for any longitudinal movement due to expansion and contraction of the cylinder. The exhaust opening is in the bottom of the cylinder, the main condenser being mounted directly beneath. Two openings are provided in the cylinder base for bleeding steam for feed water heating.

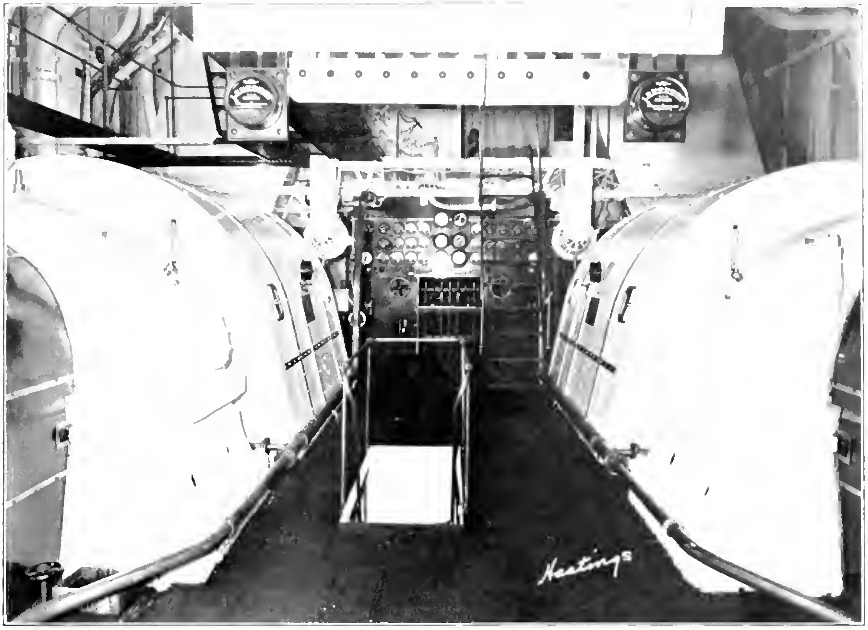
There are four nozzle blocks of Everbrite metal, each containing a number of nozzles. One block is located in the cylinder base and the other three in the cylinder cover. Suitable chambers are cast in the cylinder to provide passages to direct the steam to each of the nozzle blocks separately. Rotor shaft glands are of the combined steam- and water-sealed type. Steam sealing is used in starting only, the water sealing being effective at all speeds above one-quarter speed on the turbine.

Sensitive Hydraulic Type Governor

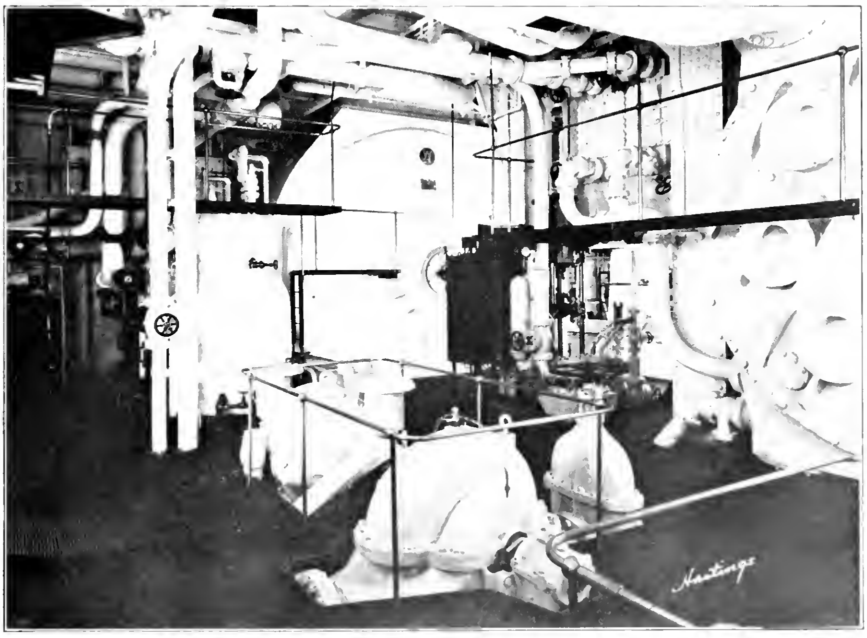
The steam chest is of the 4-valve, automatic type. The valves themselves are of the double seated poppet type mounted in parallel with the chest. These valves are connected to the governor operating pistons by means of a linkage. The secondary, tertiary, and quaternary valve operating levers are provided with a tension spring which holds its adjacent valve closed until the preceding valve has been fully opened. The governor is of the oil operated type. Steam inlet valve opening is inversely proportional to oil pressure, and oil pressure is directly proportional to turbine speed. Thus constant speed is maintained for any particular governor setting. This makes a very sensitive and quick acting governing system.

In the governor lay-out there is provided an oil-pressure relay which is connected through a small pipe to a control valve on the main control board. From this control valve a drain pipe is led to the oil reservoir. By changing the opening of this valve in the relay line the pressure on top of the relay may be adjusted, which means that the turbine can be set for operation at

*Manager Marine Engineering, Westinghouse Electric & Manufacturing Company.



Above, the operating platform of the engine room of the Steamship President Coolidge, featuring two 15,000-horsepower Westinghouse turbo-generating sets and the control stand. Below, the lower platform, featuring the starboard Westinghouse 13,250-horsepower propulsion motor.



any speed from one-quarter to full speed and still be under the control of the governor at all times. Thus, the only connection required between the turbine governor and the main control board for changing the turbine speed is a small oil pipe.

At the high pressure end of the turbine is mounted an automatic stop governor arranged so that it will close the throttle valve and shut down the turbine in case of excessive speed or in case of failure of the thrust bearing resulting in axial movement of the spindle. The throttle valve is held open against a spring by oil pressure so that any failure in oil supply automatically shuts off the steam.

The oil for operation of the governor and throttle valve and for complete lubrication of the turbine generator sets is supplied by one of two turbine-driven, vertical, centrifugal type, lubricating oil pumps. These pumps are on the lower engine room level, submerged in the oil reservoir. From the pump discharge a part of the oil is led directly to the governor operating cylinders, another part to the throttle valve operating mechanisms, and the rest to a cooler. From the cooler, part of the oil is led to the oil impeller suction on the turbines and the remainder is led to the gravity feed tank in the engine room trunk. This gravity tank supplies the main bearings of the turbines and generators. The oil impeller on the turbine shaft operates the governor relays and lubricates the turbine thrust bearings. Drains are provided from all points back to the reservoir. Either main lubricating oil pump has capacity to supply the normal needs of both main units. With one pump running, if pressure drops to a predetermined value, the other pump will be automatically started. A De Laval No. 302, motor-driven, centrifugal separator insures clean lubricating oil for the turbines and the propulsion motors.

Main Generators Develop 10,200-kilowatts Each

Each main generator is rated at 10,200-kilowatts, 4000 volts, 2660 revolutions per minute, and is of the 3-phase, 2-pole type. In the frame construction, structural steel shapes are welded into form to give a very rigid frame of minimum weight. An unusual arrangement has been provided in that an outlet can be opened at the top of the frame to permit cooling air to discharge directly into the engine room in case the water cooler in the closed ventilating system should become inoperative.

The stator core is made up of the best grade of segmentary steel laminations, there being six segments per circle. Each segment has two anchor notches that fit over the punching support rods mounted in and welded to the frame. Throughout the core, H-shaped spacers are used approximately every two inches to provide passages for ventilating air. Layers of paper punchings are placed at intervals throughout the core to reduce circulating current in the laminations. Twelve through studs pass through the punchings and end plates, thus providing support for the end plates and giving a very compact lamination assembly. These bolts are insulated both from the laminations and the end plates. The coil slots are of the open type and the coils are held in place by micarta wedges.

The best grade of mica insulation is used on the stator coils. In addition to special insulation of the individual strands of the coils, the completed coil is insulated from the slot portion with a black bond mica folium wrapper. This material was developed primarily for use on high voltage machines. Coil end connections are securely supported and braced by triangular shaped pieces of micarta and the coils are rigidly braced to one another by means of treated hardwood blocks.

Each end of the generator is provided with two end bells made from sheet steel, welded. The inner end bells enclose the stator end windings, while the outer bell provides the air space for directing the ventilating air. Labyrinth sealing glands are provided in the outer end bells to prevent leakage of the ventilating air. Fans mounted on the generator rotor circulate air through machine and through coolers mounted just below the generator foundation, thereby eliminating large ventilating ducts and reducing to a minimum the noise which usually results from air circulation in a high speed rotor. Water for the air coolers is taken from a connection on the discharge pipe between the main condenser circulating pump and the condenser intake.

The generator rotor is a solid steel forging, machined with radial slots to receive the field winding of strap copper insulated in molded mica cells. Grooves cut below the coil slots and holes drilled through the rotor teeth form ventilating air passages.

For convenient measurement of stator temperatures, nine resistance coils are embedded in the armature winding and located so as to give the highest temperature obtained in operation. The instruments for measuring the temperatures are mounted on the main control board.

For fire protection, sprinkler pipes installed in the end bells, opposite the air gap are connected up to a fresh water system with valves arranged for emergency use. Electric heaters are installed underneath the stator end windings to prevent moisture from collecting during idle periods. There are two 750-watt heaters at each end of the machine.

First Completely Fabricated Synchronous Propulsion Motors

The propelling motors are of the synchronous type, each rated 13,250 horsepower. They have 40 field poles, thus giving a speed reduction ratio of 20 to 1 between the main turbine and the propeller shaft. Thus the normal motor speed at full power is 133 revolutions per minute. Of the self-contained, 2-bearing, bracket type, these motors are entirely fabricated from steel plates and shapes by welding, the only castings used being the bearing housings and shells. The design of spider worked out for this installation resulted in an extremely strong construction with uniform stress distribution and with minimum weight. Each motor is separately ventilated by means of a motor-driven, propeller-type blower which is mounted directly in the air passage duct in the engine room trunk. This blower is arranged so that it forms a part of the duct, thus eliminating foundation, requiring minimum space, and providing a very efficient blower. The driving motor is of the vertical type and mounted just below the blower unit. Ventilating air for the motors is taken out of the engine room and exhausted through the after funnel.

The motor stator frame is of the rigid box section type, welded from steel plates with an opening at the top for discharging the ventilating air. The stator core is built up of steel laminations of the best grade, there being 20 segments for a complete circle of punchings. Vent spacers are provided every two inches through the core width. The stator coils are completely formed, molded, and insulated with Class A material and mica. The coils are held in the slots by fiber wedges. The coil ends are lashed to insulating steel supporting rings. The brackets are made from heavy steel plate, forged into a dome shape with reinforcing radial arms and rings welded inside the plate. Six circular screened openings are provided in each bracket for entrance of the ventilating air. Bearings are of the sleeve, oil-ring type having two rings per bearing de-

The dynamo flat of the Steamship President Coolidge. On this flat are mounted four 500-kilowatt Westinghouse geared turbine, 240-volt, 1200-R.P.M. electric generating sets to take care of auxiliary electric power, excitation load, and lighting load.

signed to permit operation with permanent inclination at 15 degrees laterally or longitudinally. These bearings are also supplied with forced-feed lubrication from the gravity tank, and are provided with illuminated side flow indicators and thermometers in the discharge oil line.

The field poles are arranged with slots in the pole head for the bars which form the squirrel cage maneuvering winding. This squirrel cage winding is connected between poles by means of heavy bolts held by lock washers. The field coils are made of copper strap wound on edge and provided with mica and asbestos insulation. The brass alloy collector rings and brush rigging are mounted at the forward end of the motor inside the bracket.

The propelling motors are provided with fresh water fire protection arrangement and heaters in the lower part of the motor frame for use when the machine is idle. The heater capacity at each end of the motor is two kilowatts.

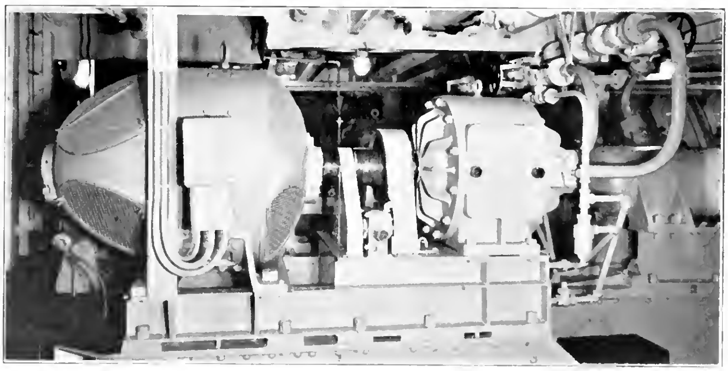
Main Control in Two Units

The propulsion control equipment is mounted at the after end of the upper engine room level and is housed in two compartments surrounded by a protecting metal screen. In the after compartment are mounted the 1500-ampere, 4000-volt, manually operated air break switches in the circuits between the propelling motors and generator stators. These switches are used for reversing two phases of the primary circuits to effect reversal of the propelling motors. This compartment also contains the necessary current and potential transformers and the change-over switch, which is used to make proper connections for operating both motors from either generator alone. The access door to this compartment is provided with an interlock connected in the trip circuit of the generator field circuit breaker, so that opening the door removes voltage from the generator.

In the low voltage compartment are mounted the switch groups carrying the manually operated contactors for making the necessary motor and generator field connections.

These field and reversing switches are operated from levers mounted in a control desk which is made a part of the front panel of the control assembly. This desk carries seven levers, two for adjusting the speed of the two turbines, two for operating the port and starboard field switches, two for operating the corresponding reversing switches, and one in the center for operating the change-over switch. With the ship operating on both main units, the control levers on both sides can be brought to the "off" position, which will allow the change-over lever to be thrown to either the port or starboard generator, after which the motors can again be started, taking power from the single generator. This complete change-over in set-up connections can be made in less than one minute's time.

Both the main generator and propelling motor field rheostats for one side of the ship are incorporated in a single frame with face plate contact arms geared to one operating hand-wheel on the control board. The design of these rheostats was very carefully worked out in conjunction with the test data taken on the machines in such a way as to provide practically 100 per cent. power factor for any setting of the rheostat hand wheel. Furthermore, for single generator operation, the port and starboard generator and motor field rheostats are clutched together by a simple device mounted above the control levers so that both sets of rheostats are operated from one hand wheel on the side of the



The steering gear of the Steamship President Coolidge. In the foreground is featured a 75-horsepower Westinghouse motor driving a Waterbury hydraulic pump. Two of these units are installed, each capable of providing hydraulic power to operate the hydraulic rams of the steering gear. This gear and its control is furnished by the American Engineering Company.

board which is being used in single generator operation. Under this condition, also, the power factor is maintained between 99 and 100 per cent. for any setting of the rheostats. The control levers are ingeniously interlocked to insure correct sequence of operation.

The panel above the control desk carries all the necessary electrical instruments as well as steam pressure and vacuum gauges for the complete record of the operation of the propulsion plant. This panel also carries the phase balance relays used to protect the generators and motors against unbalanced conditions, such as would be caused by a ground. In this case, these relays function to open the generator field breaker. The control panel also carries temperature indicators to measure the temperature of the generator rotors and the nine temperature indicating coils in each main generator stator and corresponding six coils in each motor stator. On each side there is also a triplex ground detector voltmeter to indicate grounds on any phase.

The propulsion motors turn outboard for driving the vessel ahead, the starboard propeller being a right-hand screw and the port propeller a left-hand screw. Thrust is taken on independent Kingsbury two-shoe type bearings immediately aft of the motors. Propellers are of the built-up type with three manganese bronze blades and semi-steel hub. Blade sections are of the standard ogival shape.

Auxiliary Turbine Generators

Steamship President Coolidge has four 500-kilowatt, geared-turbine generator sets to supply direct-current for auxiliary electrical power load, excitation load, and lighting load. Under normal conditions, two of these generating sets will supply sufficient power for all purposes. Under peak load conditions, such as at meal time and when operating in the tropics and with a large refrigeration load, three generating sets will be in operation. This always leaves one unit as a spare.

The turbines driving the auxiliary generators are of the combined impulse and reaction type. The forged rotor spindle carries two rows of impulse blading and 18 rows of reaction blading. The cylinder carries one row of impulse blades and 18 rows of reaction blades. The gear end of the turbine casing is supported by the gear case and the exhaust end by a plate which is bolted to the cylinder and the structural steel bedplate. This plate forms a flexible member which allows free expansion of the turbine cylinder. The turbine rotor is carried in two bearings and is provided with a Kingsbury thrust bearing. Glands of the labyrinth and water sealed type are provided at both ends of the casing.

The auxiliary generators are compound-wound and each is rated at 500 kilowatts, 240 volts, 1200 revolutions per minute. They are limited 3-wire machines providing 120-volt power for normal excitation of the propulsion generator fields. Balance coils are used to obtain the 120 volts between the neutral and positive or negative leads. These coils are of the oil-cooled, marine type mounted in welded sheet steel tanks, with radiation tubes on the sides of the tank.

The generators are of the rugged marine type with rolled steel frames and are of the completely welded type, resulting in a very compact machine with minimum weight and uniform magnetic circuit.

The four auxiliary generating units, with the auxiliary switchbard, are located on a flat on the port side of the upper engine room level. This switchboard carries the control apparatus for the generating sets, the necessary feeder switches for the ship's auxiliaries, and the control for two 300-ampere balancer sets which supply 115-volt power for the lighting circuits. Each balancer set consists of two compound-wound, direct-current, 120-volt machines coupled together and mounted on a bedplate.

Steam Generating Plant

Steam for these main and auxiliary turbines is generated at 300 pounds pressure and 200 degrees Fahrenheit superheat in 12 water-tube boilers of the well known Babcock & Wilcox interdeck, superheater, marine type. These boilers are located in two boiler rooms, six boilers in each room arranged three abreast with drums athwartship. The forward stack takes the flues from all boilers, the after stack being used solely for engine room ventilation. Steam drums of the three forward and three after boilers are fitted with desuperheating coils for furnishing steam to the saturated steam auxiliaries. The total heating surface of the 12 boilers is 57,600 square feet, and the total sup-

One of the firerooms of the Steamship President Coolidge, showing the very neat installation of steam piping and featuring the furnace fronts of four of the twelve Babcock & Wilcox interdeck, superheat type, marine, water-tube boilers. The high pressure steam pipes are covered with 85 per cent. Magnesia and with Johns-Manville Super-Ex insulation material. Fuel oil for these boilers is measured by Empire oil meters.

erheating surface is 5700 square feet. Each boiler is fitted with four Babcock & Wilcox Cuyama-type burners for burning fuel oil under cold forced draft. Diamond soot blowers and Babcock & Wilcox automatic feed regulators are fitted.

All high pressure steam pipes are insulated with 85 per cent. Magnesia and with Johns-Manville Super-Ex pipe coverings. For low pressure steam pipe insulation and for insulating bulkheads and partitions, large quantities of Johns-Manville improved Asbestocel are used.

In each boiler room are installed three Griscom-Russell fuel oil heaters, two of which have sufficient capacity to take care of the full load demand for six boilers. One Quimby horizontal motor-driven fuel oil pump in each fireroom supplies all 24 burners, and two Warren steam-driven vertical simplex oil pumps are installed as stand-by. Air is delivered to the burner fronts through ducts on the open fireroom system by four motor-driven Sturtevant Silentvane blowers.

Feed Heating System

The condensate is drawn from the main condensers by the condensate pump which discharges through the air ejector condensers to the feed tank. All the latent heat of ejector steam is thus conserved, no raw water pass being fitted. There are two Warren 3-stage centrifugal main feed pumps, each driven by a Terry turbine. Each main feed pump has sufficient capacity to supply all the boilers at full power. There are also three Warren independent steam-driven vertical simplex auxiliary feed pumps, one in the engine room and one in each fire room. The feed pumps draw from the feed tank and discharge through two Davis Engineering Company's heaters arranged in series and having sufficient capacity to heat the feed water to 300 degrees Fahrenheit. The first stage heater utilizes the exhaust from the steam-driven noncondensing auxiliaries, augmented by steam bled from the eighth stage of the main turbines. Steam for the second stage heater is bled from the third stage of the main turbines.

Main Condensing Plant

Each main generator turbine is served by a 14,000-square foot, 2-pass, surface condenser located immediately below the turbine. The condensers are supported on flexible beams so designed as to insure protection for the turbines from undue stresses due to the weight or vertical expansion of the condensers. Circulating water is supplied to each condenser by two-

Westinghouse motors driving the winches for handling the Welin lifeboats on Welin-MacLauchlin davits.

motor-driven Warren single-stage centrifugal pumps each having a capacity of 10,000 gallons per minute. Each condenser is served by two 2-stage sets of Westinghouse air ejectors mounted on a combined inter-and-after condenser.

All electrically operated auxiliaries on the Steamship President Coolidge are equipped with Westinghouse motors, Westinghouse Electric & Manufacturing Company supplied also the electrical heaters for staterooms and all bracket fans for staterooms and public rooms.

On both of the new Dollar liners, the wire rope for rigging and for all hoists was supplied by the Wickwire Spancer Steel Co., a total of 20,795 feet going to each vessel. On both vessels the refrigeration spaces are insulated with Armstrong corkboard and the cold pipe lines with Armstrong cork covering. More than half a million board feet of corkboard were used. The hulls of both vessels are protected from the elements and are assured of a clean under-water surface by American Marine Paints.

In all details, with the exception of the machinery installation as herein described, the steamship President Coolidge is an exact duplicate of the steamship President Hoover, which was described in great detail in the August, 1931, issue of Pacific Marine Review.

The sun deck on the Steamship President Coolidge featuring Westinghouse motors driving Sturtevant Silentvane blowers for the exhaust and supply ventilating systems.

The Marine Interior Architect

A New Term added to Shipbuilding Technology in Connection with the Design and Construction of Passenger Accommodations on the New Dollar Liners

WHEN a new ocean liner has been needed in the past, the usual procedure has been for the naval architect to design the arrangement and spacing of the passenger accommodations along with the rest of the vessel. Then, working from the general arrangement and details provided by the naval architect, complete working details would be made up by the draftsman at the shipyard and the ship would be completed as a structural unit. Then an interior decorator would be put on the job to make the interiors as beautiful as possible under the circumstances. With a few outstanding exceptions, this method has resulted in a stereotyped arrangement of staterooms and a rather slavish following of the palace or hotel modes of interior decoration.

Some years back, the Dollar Steamship Lines, Ltd., Inc., began remodeling and enlarging the passenger accommodations of its round-the-world liners. In this connection, although much of the structural work was done in Atlantic Coast shipyards, the Dollar Line sought the advice and experience of A. F. Marten Co. of San Francisco, interior decorators and furniture builders with a well rounded organization. This firm successfully developed satisfactory designs for several of these vessels, built the furniture, selected the draperies and color schemes, and supervised the installations at the Atlantic Coast yard.

When the Dollar organization, in conjunction with the naval architects of the Newport News Shipbuilding & Dry Dock Company, had completed acceptable preliminary plans for the new "President" liners, this satisfactory experience was still a fresh memory. It was therefore a natural step that the A. F. Marten Co. should be asked to prepare and submit proposals for arrangement, decoration, and furnishings of the staterooms and public rooms on these vessels.

The A. F. Marten Co. not only submitted their proposals, but they immediately built two full size model staterooms, one for communicating bath and the other for private bath. These rooms were equipped with every detail that was to go into the corresponding space aboard ship. After very serious consideration of these proposals, the Dollar Steamship Lines decided to accept them and the contract for interior architecture and decoration was given to the A. F. Marten Co. of San Francisco.

This is the first instance of which we have any knowledge where a firm of interior decorators has actually designed the arrangement and the structural details of the interiors of passenger accommodations on a passenger liner before the keel was laid in the shipyard. The results are most colorful and pleasing interior decorative effects, with practical stateroom arrangement, and with some new structural details that add greatly to economy of installation and maintenance and at the same time enhance the attractiveness of the interior finish.

Ceiling Construction

The orthodox method of applying Vehisote or other plyboard material to ceilings is to secure panels in place by the use of battens over the panel joints. These battens for fine work are mortised into the cornice moldings at the top of side and end walls. When such panels had to be removed to get at leaky pipes, it frequently meant that the entire ceiling of a room would be ruined. For the liners President Hoover and President Coolidge, a new method was evolved. On these vessels, 2x4 pine timbers, surfaced, are built into a grid to furr out the ceilings. The plyboard panels are fastened to these timbers with brads or screws, and a wide groove is left between the panels exposing the surfaced pine timber. Painted in white or tints to suit the decorative color scheme, this construction makes a very pleasing grooved panel ceiling; and each panel is easily removable to get at wiring, piping, or ventilating ducts.

Wall paneling in all staterooms was designed in connection with the width of set pieces of furniture and the shape, size, and location of electric fixtures by the same organization that designed and built the furniture and designed the electric fixtures. To this feature credit is due for much of the beauty of detail and the harmony of the general arrangement. Bathrooms are tiled and all plumbing is concealed. Here, again, the practical side of ship operation and maintenance is fully considered. Plumbing is located so that it can be made accessible from outside the bathroom, and wherever necessary the wall panels are easily removable for getting at plumbing connections. Noncorrosive materials were, of course, specified for all metal fittings.

Stateroom Arrangement

Doors of 30-inch width were specified and installed instead of the usual 27-inch width. In the rooms having communicating baths, the arrangement of the space is ideal. Entering the 30-inch door from the passageway, we find ourselves in a vestibule from which an arched opening at its further end leads into the bedroom. On one side of this vestibule another arched opening leads into a dressing room, which, in turn, opens into the bathroom. In the dressing room two full size wardrobe closets are fitted on one wall and on the other two wash basins, each of which is equipped with a full complement of fittings in chromium plate. Mounted on the wall over each basin is a monel metal cabinet with plate-glass mirror mounted on the door and with rubber-mounted plate-glass shelves. The bathroom is a modern tiled apartment in colors, fitted with molded porcelain tub and highest quality concealed plumbing. The stateroom is large and, as it contains only the beds, dresser, lounge, and chairs, it becomes a comfortable combination bed and sitting room.

This idea of combining utility with beauty and comfort is carried out in the design, construction, and decoration of all public places. All paneling whether it be of plyboard, Vehisote, or hardwood is installed in such fashion that wherever necessary it may easily be removed without injury to get at piping, wiring, or ventilating ducts for any needed adjustment or repairs.

Special Materials and Equipment

Much study was given to the best, most economical materials that could be used to produce the most beautiful effects. For example, there is lavish use of stainless, noncorrosive ferrous alloys like Allegheny Metal instead of nickel or silver plate in the decorative treatment of certain spaces and features.

Large ceiling panels are of Vehisote, and this material is also used largely in wall paneling.

In making up hardwood veneer and hardwood slab panels, the most effective and most beautifully grained hardwoods of the world were pressed into service. Much study was given to the problem of artificial illumination, and many special fixtures, designed by the A. F. Marten Co. of San Francisco, were built especially for these two vessels by Cox, Nostrand & Gunnison of New York.

Adequate natural illumination of public spaces is insured by a liberal use of Kearfott casement-type windows built by the Kearfott Engineering Company of New York. Kearfott frameless windows are used too, on the enclosed portion of the promenade deck. The modern Schlage Marine Lock is used on all stateroom doors.

In first class and special class staterooms, the beds are of metal in the full size twin style. All of these beds were specially built for the two ships by the Rome Company of San Francisco who furnished also the de luxe type coil springs in special noncorrosive steel. Mattresses for these beds were all built for the job by the Simon Mattress Manufacturing Company of San Francisco. They are of the Simon Pure inner-spring type, with springs of noncorrosive material specially heat-treated and retempered after coiling. The ticking is of extra quality, tufted by the Sanatuf process and fitted with special rustproof metal ventilators. Filling is of the finest quality hair. Simon Pure spring covers and President Pillows were also supplied by this firm.

Especially woven pure woolen blankets for all first-class staterooms were supplied by the Oregon City Woolen Mills of Oregon City, Oregon. The top blanket is ocean blue on the face and gold on the reverse, with an attractive scroll design and the words "Dollar Lines '31" woven in at each end of the blanket. The make-up blanket is in an attractive, all-gold modernistic weave designed exclusively for these ships.

Controlling Motif

Every department of architectural art has its own traditions, its peculiar forms, and its unique adaptations. Naval architecture is no exception. In fact, it may be said to be more individual in these respects than any other branch of the art. In the development of great passenger liners, the naval architect has progressed along the hull lines best adapted to structural strength and to propulsive efficiency. This progression presents a problem to the interior decorator, for he finds himself confonted with a public room space in which there is a progressive difference in form throughout. During the past three or four decades of maritime progress, there had developed in the mind of the interior decorator an idea that he must, in properly decorating the public spaces aboad ship, produce the atmosphere of a shore-side hotel or mansion or palace; and so we find ships described in those terms. This idea has led to a vogue for hiding entirely the ship structure forms and thereby in many instances producing spaces that lose much in spaciousness both of lateral and vertical dimensions.

Having the opportunity of cooperating with the naval architect from the beginning, the A. F. Marten Co. determined to carry out their decorative scheme along rather original lines and, so far as practicable, to incorporate the structural features of the hull with the decorative treatment. Their desire therefore was to create a distinctive passenger liner atmosphere, suggestive not so much of the stationary hotel or mansion as of the spirit of world-wide modern marine transportation.

Wherever such construction was found practicable, the interiors of the steamship President Hoover and the steamship President Coolidge not only incorporated the structural features of the hull, but in several spaces emphasized these features. For example, ceiling of the smoking room, every deck beam is enclosed in hardwood and the beam spaces are beautifully cored in hardwood paneling, thus adding apparent height to the ceiling and providing ideal recesses for some very original and effective lighting fixtures. Another instance is the boxing of the fore and aft girders to form a very effective beamed ceiling in the lobbies and main entrance foyer. A third example is the treatment of the port lights in the dining room space, where the recess in the wall treatment boldly emphasizes and beautifully decorates the actual ship structure in the way of the ports.

The Ship's Bathroom

On the other hand, in the treatment of bathrooms, conventional marine interior decorators have clung to paint on the steel work and open plumbing with tiling on the floor only. About seven years back a few bold spirits began to demand color tile treatment of ship's baths. So far as we know, the first instance of complete tiling of bathrooms afloat was in the rebuilding of the passenger accommodations on the steamship City of Honolulu at the Los Angeles Shipbuilding & Dry Dock Company's yard in 1927. All bathroom spaces on the new Dollar liners are either completely or partially tiled on floors and partitions. All plumbing is completely concealed and yet, as already explained, all plumbing connections are easily accessible without disturbing any of the tiling.

The unusual color schemes and the bold, unique combinations of certain architectural features are so controlled and tempered in the governing motif of the complete design that the resultant impact on passenger or visitor is one of peculiar pleasure and approval. One feels that here is a distinctly different treatment than one expects to find aboard ship and is immediately brought to the realization that it is very beautifully different.

For many years the marine world has known that the Pacific Coast shipyards could build hulls and produce propulsion machinery that would measure up to the best. Now the world will be shown that Pacific Coast Marine Interior Architects and Decorators have produced passenger liner interiors which can proudly challenge comparison.

Lighting the Dollar Liners

Fixtures of Modern Design and Economical Arrangement Illuminate Passenger Accommodations of the Steamships President Hoover and President Coolidge

By A. L. Powell*

IN discussing the lighting of the steamship Excalibur in the March, 1931, issue of Pacific Marine Review, the writer pointed out that American passenger ships must take a lead from foreign practice and become more up-to-date in their decorations and appointments if they are to meet the present severe competition. It was indeed a pleasure to inspect the new steamship President Hoover and see how successfully the designers and decorators, A. F. Marten Co. of San Francisco, in cooperation with the Newport News Shipbuilding & Dry Dock Co. had accomplished their work. One had the feeling that they had kept in mind some of the best features of the recent French and German boats, had eliminated the freakish elements, and developed something more rational and better suited to the American taste. The result is what might be termed an original American conception of the modern spirit in decoration. They have taken advantage of the decorative possibilities of various rare woods and have combined these with colorful modern treatment of fabrics.

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Bedroom of one of the French suites featuring ceiling fixture, wall brackets, bed lamps, and dressing table lamps.

One end of first class lounge, featuring illuminated console and indirect ceiling luminaires.

Lighting has been by no means neglected; and the accompanying illustrations show many unique developments. In general, the lighting is most satisfactory. There is no monotony of system. Direct, semi-indirect, and totally indirect lighting are all applied to various areas. The fixtures themselves are pleasing unlighted and, as a whole, well designed for their illuminating properties. Built-in lighting has been applied where suitable, and touches of light for decoration are in evidence.

It is hard to realize what an advance has taken place within the last few years, and no better illustration of the growing appreciation of the art of lighting can be obtained than by comparing this installation with one which represents standard practice a decade ago.

The illustrations show a few representative areas of the ship. The furniture throughout was designed and constructed by the A. F. Marten Co. in their San Francisco factory and shipped East. The lighting fixtures were made by Cox, Nostrand & Gunnison from designs developed by the decorators.

Space will not permit a detailed description of the many interesting public areas, yet it seems desirable to analyze in some detail the decorations and furnishings of the continental lounge or grand salon, which is more or less typical of, although different from, the other important rooms. The room as a whole is 60 by 70 feet with a ceiling of 12½ feet in the outer portion with a central light-well. This is covered by a leaded art glass skylight of dome shape rising to a height of 22 feet. White, light amber, and light flesh tones of glass are used in this. Several feet above the art glass

The smoking room of the Dollar liners is finished in dark Bubinga paneling. Adequate illumination is secured by the use of unusually large ceiling fixtures in cylindrical form nested in the coved ceiling.

window is a protecting roof with a number of circular ports through which daylight enters. A series of shallow reflectors with 40-watt Mazda lamps are mounted in the spaces between these ports to illuminate the area at night. The side walls around the light-well curve inward slightly and are finished in white with gold decorations. A number of decorative ventilator grilles, which also conceal loud speakers, are inserted. This whole surface is lighted from a cove, the edge of which forms an interesting ornamental motif, and 25-watt Mazda lamps on 8-inch centers are used. The central floor area has a removable rug and is used for dancing.

A moving picture screen on a roller is hidden in the alcove ceiling for use when desired. In our view of the opposite end of the room are several large mirrors so constructed that the upper sections may be lowered to permit projection of sound movies from the booth behind this wall. Between the mirrors is an interesting Fifteenth Century Sumatran hanging, below which will be noted a luminous console table. This is made of 1-inch thick glass carved and etched with a decorative design. It is mounted in a frame of mahogany and a number of small lamps are placed at the sides and across the bottom.

For general lighting, twelve totally indirect ceiling luminaires of brass of unique contour are used. On the ceiling directly above each fixture is a raised design in gold which seems to tie the fixture in with the decorative scheme most effectively. On the sides of the room are single wall units which consist of short frosted glass cylinders.

[The Magazine of Light]

The first class dining saloon has a central well, lined with mirrors. A scheme of indirect and semi-indirect ceiling illumination is used in this part of the space. The wing spaces are illuminated by wall and ceiling fixtures of the semi-indirect type.

Ten Years with I. M. M.

A Short Account of the Developments of the Decade in America's Largest Marine Operator

THE September-October issue of "The Ocean Ferry," travel magazine published by the International Mercantile Marine Company, marks the tenth anniversary of that publication and contains a very interesting article by P. V. G. Mitchell, vice-president of the I.M.M., reviewing these ten years of merchant marine progress. This article is an abstract of Mr. Mitchell's review.

It has been a kaleidoscopic decade, begun in the receding tide of a feverish post-war prosperity and continuing through a long period of inevitable readjustment, apparently now happily drawing toward its close.

In those years the world's chief shipping companies, as well as those of less importance, have felt the effects of profound and fundamental changes that have been in progress. The International Mercantile Marine Company is no exception, but through all the altered conditions of the time, it has maintained its position, while achieving certain outstanding results that seem destined to have a far-reaching, beneficial effect on the American merchant marine and on world travel.

Nationalism, stimulated by the war, has been the mainspring of world shipping in the past ten years. Each of the maritime nations of Europe has sought to increase its volume of tonnage and its sea-borne trade. The United States of America has done the same. The achievement of this country in putting on the seas in the war period a vast, specially-built merchant fleet, in time to affect the outcome of the great struggle between the nations, had a logical reaction in the minds of Americans, expressed in an earnest desire to see their flag carried by a prosperous merchant marine on the world's principal trade routes. This desire resulted in much needed legislation under which it became possible to build large American ships and keep them employed, with a reasonable prospect of fair return for the money invested.

Creating a Great Line

Under these conditions it was possible for the International Mercantile Marine Company to develop the Panama Pacific Line, operating between New York and California ports by way of the Panama Canal.

The rise of the Panama Pacific Line must be given a leading place in the history of modern American shipping. Founded in the year the Panama Canal was opened to commercial traffic, 1915, the line was the first to operate passenger ships between New York and California ports by the Canal route, which as we know, reduced the old Cape Horn voyage of 13,135 miles by a matter of 7873 miles. It is a matter of official record that the Kroonland, the first ship dispatched in the new service, was the first ocean-going passenger vessel to make the transit of the Canal from the Atlantic to the Pacific. The date was February 2, 1915. The Finland followed.

Enough voyages had been made to show the importance of the route when earth slides blocked the Canal and brought the service to what seemed a temporary halt. But by this time the world war was growing to vast proportions, and the Finland and Kroonland were assigned to special work in the Atlantic. This service, and post-war occupations, occupied so many years that the decade now under consideration was well advanced before the ships could be returned to the Intercoastal route. This was done in October, 1923, and it is from that date that the present chronicle of the Panama Pacific Line has principally to deal.

Attracting a New Clientele

By maintaining transatlantic standards in catering to the comfort of its passengers, with a skill that had come from half a century of experience, the Panama Pacific Line established itself in the new field on a foundation of service so firm it could not be shaken. Its traveling public was unlike that in the transatlantic trade, being largely made up of home folk, who could not be termed "regular travelers." To this type of passenger the novelty of a voyage on a great ship, with a varied table, international in character and with stewards long trained in bestowing flattering personal attention on travelers, opened a door to new and alluring prospects in ocean travel.

As a result, the public flocked to the Panama Pacific Line. The same may be said of shippers, for the line presented the hitherto unattainable service of coast to coast delivery of freight on regular, fast passenger schedules. The line prospered from the start in its freight carrying, as in its passenger business.

In less than five years after resumption of the Panama Pacific sailings, business warranted the construction of new and larger ships. Here the experience of years was drawn upon, and three vessels were designed —the California, Virginia, and Pennsylvania, electric liners, at that time the only ones of their kind, and then the three largest merchant vessels built under the American flag.

The Panama Pacific Line is still the only line operating an express passenger and freight service exclusively between New York and Pacific Coast ports; the only line with a complete fleet of electric-drive ships, and the only intercoastal line with docks in New York City.

Creating the "White Collar Business"

No review of the past ten years in the company's history would be complete without consideration of its leadership in the creation of the now popular and important "white collar" element in tourist travel across the Atlantic.

Ten years ago the whole world was in a ferment of national complexes. The war had given men and nations new ways of thinking. Whereas before 1914, the United States welcomed the alien, found him a home, and guided him on the road to citizenship, in 1921 sentiment was crystallizing against a liberal policy in immigration, and laws had been enacted, or were in contemplation, making drastic cuts in the flow of emigrant travel from Europe—the old-time third class business that was the backbone of most of the important transatlantic lines.

This was a blow to these shipping interests somewhat akin to that dealt the great breweries of the United

States as a result of the Eighteenth Amendment. A very large portion of the investment in transatlantic liners had been made with a view to handling normal third class business as it existed before the war. Changed laws, cutting immigration to a third and later to less than a quarter of its former limits, made much less valuable the extensive plants aboard ship for taking care of that special business.

Readjustment, therefore, was called for on a drastic scale. What was to be done with the vacant third class quarters on transatlantic ships? It was a question long pondered before an answer was found, and it is an unquestioned fact that the answer came from the International Mercantile Marine Company, which originated the plan of making "white collar" business take the place of third class—to induce the average American to travel in the idle space, improved for his occupancy.

How this was accomplished is a matter of record. The first party of white collar tourists traveling in the improved third class quarters—soon to be known as Tourist Third and now known as Tourist Class—traveled on an International Mercantile Marine Company ship, the Regina, out of Montreal for England. The date of her sailing was June 21, 1924. This was followed by the Minnekahda from New York, July 3.

Here was the beginning of one of the great fundamental changes of the decade in transatlantic travel.

The development of the white collar tourist trade is so recent that no extended review of its progress is needed here. Suffice it to say that in 1930 the total movement of tourist third cabin business across the Atlantic was as follows: Eastward 127,418; Westward 138,345. As a matter of course, the International Mercantile Marine Company lines led in this new type of business,, carrying a total of 60,522 tourist passengers in 1930. The I. M. M. lines have held the record for these carryings for six years past.

Adding Value to Travel Dollars

Paralleling the development of the "white collar" tourist trade, was a general grading up of values in accommodation for all travelers who count their travel cash. The process which has extended throughout began with the appearance of the Minnekahda of the Atlantic Transport Line—another International Mercantile Marine Company ship—as the first liner devoted exclusively to tourist traffic.

In 1924, a new classification in transatlantic ships was created, for there had been no "Tourist" liner before the Minnekahda.

In keeping with the trend of the times toward democracy as well as moderate rates, second class on a number of the company's leading liners was converted into tourist—thus removing a barrier to American patronage—for Americans are not fond of the term second class—while at the same time making further available superior quarters at very moderate rates.

The marking up of travel dollar's purchasing power was extended by the International Mercantile Marine Company with equal success to what may be termed the medium class ships. Vessels that had made their reputation in carrying first class, as well as other classes, were assigned to the cabin class group. The beautiful Lapland of the Red Star Line was an outstanding example. The White Star Line's "Big Four" to Liverpool long noted for the club-like quality of their first class service, became cabin ships. This change and the conversion of the Lapland emphasized to a marked degree the radical change that was going on toward increasing the quality of medium class accommodation. Quarters formerly bracketed as first class became obtainable at rates about one-half those prevailing in first class on the monster ships.

This grading down of price and grading up of quality given for the dollar, was never more strikingly emphasized than with the appearance, in 1929, of the White Star liner Britannic. Built as a cabin liner, this mammoth ship, of 27,000 tons gross measurement, outclassed in her appointments the express liners of a few years before. She was the largest British motor vessel, and the world's largest cabin liner. She and her sister ship, the Georgic, scheduled for service in 1932, easily stand at the head of the cabin liners, a position they seem destined to hold for a long time to come.

One gratifying feature of the decade has been the steadiness with which the three great express ships of the White Star Line—the Magnificent Trio, Majestic, Olympic, and Homeric—have maintained their schedules between New York and English Channel ports. This regularity has been a boon to travelers. It also constitutes a tribute to the business ability of the men responsible for the operation of those great ships.

Adding to the Company's Fleet

Some of the constructive changes in the International Mercantile Marine Company in the past ten years, besides those already noted, may be mentioned here to complete the record.

In 1928 the company, following a policy of reducing its foreign flag tonnage, while increasing its American holdings, sold the White Star Line to British capitalists, though retaining general management of the line's affairs in the United States.

In 1930, in pursuance of its fixed policy to take every possible step in the direction of developing its American-flag interests, the company effected a merger with the Roosevelt Steamship Company, thereby adding to its fleet 17 American-flag vessels.

Steps were taken under the new arrangement toward further expansion of the company's affiliations with American-flag interests, by the founding of the Baltimore Mail Line, to operate in the transatlantic trade between Baltimore and Norflok and Hamburg, which calls at Havre. Five ships, obtained from the U. S. Shipping Board, were rebuilt for the new line, of which the I. M. M. Co. became general agent. The first sailing of the new line, from Baltimore, July 2, 1931, was hailed with acclaim by its home port and opened a new chapter in the development of trade between Baltimore and Europe.

In the decade the I. M. M. Co. has opened new offices at Pacific Coast ports, with new general headquarters for the Coast at San Francisco; has taken over from agency management the handling of the freight business of the Panama Pacific Line on the Pacific Coast and has kept intact and strengthened its nation-wide organization for the handling of its passenger and freight business.

At the present writing the company numbers in its official family, afloat and ashore, no less than 14,036 employes, including sea-going staffs of its allied lines. This is exclusive of nearly 7000 passenger and freight agents who serve it as occasion arises. The company's fleet now numbers 45 vessels, of 418,320 gross tons; the vessels which it manages, as owner or agent, inclusive of the Baltimore Mail Fleet and the ships of the White Star Line, number 63 with an aggregate measurement of 796,494 gross tons.

The National Transportation Problem

A Digest of the Marine Phases of Replies to a Questionnaire Submitted to the Principal Pacific Coast Shippers by the Pacific Traffic Association

THE Pacific Traffic Association, membership in which is almost equally divided into three groups —railroad men, steamship men, and commercial or industrial traffic men (with a small but adequate group of motor truck, airway, and express transportation men), is carrying on a series of educational meetings in San Francisco to discuss various phases of the "National Traffic Problem." These meetings are part of a national program, the purpose of which is "to bring about a more general knowledge of all phases of this subject."

The first meeting was held July 28; and in opening this meeting, President Wilkens of the Pacific Traffic Association described the purpose as follows:

There has always been, from the various carriers, a demand that the public express opinions on transportation matters and it was felt in this connection that the objects of this program might be best reached by having industrial traffic men and the representatives of commercial organizations and firms undertake to present at the first meeting their views on present-day conditions, their comments on the past, their suggestions for the future, and, in general, describe to us how the National Transportation Problem looks to men who, though users of and interested in transportation, are not employed by any carrier nor influenced in their opinions by an immediate personal concern in any of those problems which affect a carrier without affecting the public at large."

In order to achieve this purpose, the committee in charge had prepared a questionnaire and mailed it to 150 traffic managers, none of whom were in any way connected with any common carrier.

William C. Hubner, traffic manager of the A. M. Castle Company, then prepared a paper presenting a digest of these replies to this questionnaire, and this paper was read and discussed at the meeting.

Regulation of Carriers

The third and fourth sections of the questionnaire were directed toward ascertaining the opinion of shippers on present and future governmental regulation of transportation agencies and on taxation. Much of the material developed by these sections is of vital interest to steamship operators as reflecting the opinion of their shippers concerning one of their major operating problems. We therefore present an abstract of Mr. Hubner's papers covering these sections, as follows:

"Our third question attempted to ascertain the opinion of shippers toward present and future delivery regulations of transportation agencies. In our question, **'What is your attitude toward the existing regulatory acts as applied to rail transportation?'** we included the questions, **'Is it too severe to meet modern transportation requirements?' 'Does it allow sufficient flexibility?' 'Are you in favor of less regulation of rail carriers?'** The replies to these questions were, in most instances, both lengthy and complete and indicated that the industrial traffic men of our association have already given no little thought to these questions.

Approximately 90 per cent. of the replies stated specifically that the present regulatory acts are not too severe to meet modern transportation requirements and most of them indicated that the writers had in mind the evils existing before the existence of the present statutes and the potential danger to the public if there were not such complete and stringent regulations as now exist. Many shippers coupled with their statements that the existing regulations for rail carriers are not too severe, the statement that such regulations are sufficient and necessary in and of themselves but are too severe in comparison with the regulations under which competing carriers operate. On this subject we quote literally part of one of the answers:

'Existing regulations covering rail lines are not too severe, nor do they unnecessarily restrict rail carriers in and of themselves, but they are too severe in comparison with the regulations governing other carriers. In theory all common carriers are the same, are created for the same purpose and in the same manner, do the same work; therefore, they should all be governed by the same set of regulations amended so as to cover the individual peculiarities inherent in the nature of their business. I believe that all should be governed by regulations exactly the same, in many respects, and that a general code of laws should cover all of them. Exceptions could and should be provided in such a code at the time it was published and further exceptions and amendments made as they appeared necessary. For example, all could be governed by a uniform code referring to the publication and maintenance of transportation rates, but it would be obviously improper to enforce on motor truck and steamship carriers the safety appliance regulations designed for railroads.

'Generally speaking, we do not believe the existing regulatory acts as applied to rail transportation are too severe, in and of themselves. However, they are too severe to allow sufficient flexibility in the matter of meeting unregulated carrier competition. We do not favor less regulation of rail carriers but, on the other hand, we believe in the regulation of unregulated carriers.'

The following statement on this point introduces another view:

'If the railroads were not subject to government regulations they could perhaps fight each other like the steamship lines do and cut rates here and there and be worse off than they are today. Sometimes I feel that they should be permitted to meet truck competition and every other competition in the way that seems best suited to them, just as private business can do. However, when it comes to making money, it strikes the writer as being doubtful as to just what the increased net revenue would be if rail rates were slashed to take in the business now hauled by trucks.'

Section 15-A, I.C.A.

Three of those replies to our questionnaire were most complete, indicated that while the existing regulatory acts are in the main satisfactory and not too severe there should be an immediate amendment or repeal of Section 15-A of the Interstate Commerce Act. The arguments employed on this topic are familiar to most of us and need not be repeated. We simply mention this point to indicate that Section 15-A is objectionable to some of our industrial traffic managers and business men, even as it is to the carriers who believe that they suffer through it. The writers of those statements indicated that they believed Section 15-A, carried to a conclusion, has the effect of bringing about some of the objectionable conditions now confronting our rail carriers. We might continue at great length on this topic, since our replies were both numerous and lengthy, but they are summarized in the statement made above to the effect that it is believed that the regulations are correct and not too severe, in and of themselves, but are too severe and objectionable only when compared with the regulation or lack of regulation under which competing forms of transportation operate. There were many lengthy and well reasoned opinions indicating that if other transportation agencies could not be regulated to some degree in accordance with the rail line regulations, then rail line regulations should be amended in many respects so as to make them less stringent and more flexible.

Regulation of Steamship Lines

The next question asked was, **"Do you believe that regulation of steamship transportation is desirable? If so, to what extent?"** Coupled with this question was the question, **"Do you believe that regulation of steamship transportation is practical?"** A majority of the answers indicated that the writers believe some form of regulation of steamship transportation to be both necessary and desirable. There was, however, a great diversity of opinion as to what authority would make and enforce such regulations and what subjects and points such regulations should cover. There was a general agreement on the fact that under existing laws adequate regulation of steamship carriers is almost impossible. Parts of some of the minority opinions on this point are quoted literally.

'Regulation of steamship transportation is desirable to the extent that it will remove any doubt as to the service in the transportation of like commodities. Regulation of steamships for the purpose of restricting service or maintaining rates at higher levels as a means of holding certain traffic to the rail carriers is undesirable. I see no reason why moderate regulation of steamship transportation would not be practical.'

'As to the steamship lines, I believe it unfair to permit them to operate completely untrammeled, but in view of the different character of their service as compared with that of the rail lines, in my opinion their regulation should not be exactly the same.'

'From the shipper's standpoint and that of the rail carrier, we believe the steamship lines should be regulated to an extent comparable with rail regulation, and we believe it would be practical to do so. This applies to intercoastal, coastal, and waterway lines.'

'We know of no demand on the part of our people for regulation of steamship lines, such as led to the adoption of the Interstate Commerce Act. However, such regulation would be practical.'

'I do not believe that governmental regulation of steamship transportation is at all desirable. Certainly there is no public demand therefor and the only advocates of such regulation are the railroads and a minority of the steamship companies. Whether or not the regulations of steamship transportation companies is practical is a question that may only be decided by a system of trial and error. It is obvious that regulation and consequent compliance with requirements of regulatory bodies must result in increased expense to the steamship companies, and that said expense must be reflected in their charges for transportation.

'Regulation has been divided by the courts into two phases: One having to do with the physical operation of the utility and the other directed to the financial return of the utility, both phases being regulated only in the interest of the public. When this is applied to steamship transportation we have little criticism of the manner in which a steamship is operated, so regulation is not needed for the first phase. If it can be shown that rates being charged by a steamship company are unreasonably discriminatory or preferential to such an extent as to injure the public, public interest demands that they be changed. Approximately 100 per cent. of the steamship business is competitive with the railroads and only a very small amount of the total freight moved by the railroads and their connections is in direct competition with the steamships. We believe the present policy announced by Congress to foster and preserve both steamship and rail transportation can be carried out under the present act without additional legislation in behalf of the steamship lines. Regulation of steamship companies as common carriers is predicated upon their being, in fact, common carriers. The majority of the steamship lines of the past and many of the present have been and are industrial carriers; that is, not operating in public interest but in the interest of a proprietary company. In order to regulate such lines as common carriers it will be necessary to divorce their proprietary interests as private carriers and make them common carriers.'

Panama Canal Question

One question asked the opinion of members with respect to the law which **prohibits steamers owned by rail lines to operate through the Panama Canal.** We find general agreement in the theory that such a law is in the interests of a majority of the public. There is some expression indicating a belief that this law, while sound and necessary when made, may have to some degree outlived its usefulness. The proponents of that theory suggest that this rule was intended to prevent the transcontinental railroad companies from restricting the steamship lines in an effort to compete for the vast tonnage moving between our Atlantic and Pacific Coast States. They point out that the situation today is that the steamship companies have made it impossible for the railroad companies to handle the same transcontinental tonnage; that the law, while designed to bring about an equality of opportunity, has in effect penalized the rail lines too severely and aided the steamship lines too much. The majority opinion, however, is clear on the point that the law should be continued in force. The allegation is made that the case with respect to this Panama Canal rule typifies the statement that existing rail regulation has not kept up

(Please turn to Page 478)

Pacific Coast

Products in World Trade

Some International News Affecting Exporters

Tanker Tonnage through Panama Canal.—4,884,113 tons of tanker cargo originating in the Pacific Area transited the Panama Canal during the fiscal year ending June 30, 1931. Of this total, mineral oils and their distillates accounted for approximately 98 per cent., or 4,761,135 tons, approximately 81 per cent. of which originated in California and 19 per cent. in Peru and Ecuador. This oil tonnage was destined as follows: 63.6 per cent. to the United States; 24.1 per cent. to Europe; 7.7 per cent. to Canada; and the balance, 4.6 per cent., to the West Indies, Cristobal, and South America.

Of the mineral oils carried in tankers through the Canal during the fiscal year 1931, approximately 70 per cent. was gasoline, benzine, or naphtha; 15 per cent. crude oil; 13 per cent. gas and fuel oils; and the remaining 2 per cent. lubricating oils or kerosene.

The balance of the oil cargo tonnage was made up of 45,911 tons of coconut oil and 12,652 tons of molasses from the Philippine Islands to the United States; 30,815 tons of molasses from the Hawaiian Islands to Europe; and 19,000 tons of whale oil from Australasia to the United States.

Vancouver-Sydney Service.—The steamship Niagara and the motorship Aorangi, two passenger and cargo liners operating under the Canadian Australasian Royal Mail Line between Vancouver, Australia, and New Zealand, have been taken over by a new company incorporated under the name Canadian Australasian Line, Ltd., and will continue operation on regular schedule. The new line will he jointly owned by the Union Steamship Company of New Zealand and the Canadian Pacific Railway.

Shanghai Lumber Market Better.—According to U. S. Commerce Reports, approximately 111,000,000 feet of lumber, consisting principally of Douglas fir and hemlock, arrived in Shanghai from American Pacific Coast ports during the first six months of 1931, with an additional 4,500,000 feet from the Philippine Islands finding its way into the market, according to figures obtained from the Chinese Maritime Customs. This represents a substantial increase over imports for the same period in 1930, which totaled approximately 85,000,000 feet, of which 5,500,000 feet were from the Philippine Islands. In 1929—a record year for imports of lumber into Shanghai—130,000,000 feet were imported during the first six months, or only slightly more than during the present season. Stocks on hand at the end of 1930 were estimated at approximately 60,000,000 feet, while present stocks are estimated at from 70,000,000 to 75,000,000 feet, which indicates that almost the entire amount imported has been consumed.

Commodity.	Fiscal year ended June 30—			
	1928	1929	1930.	1931.
	Long tons.	*Long tons*	*Long tons.*	*Long tons.*
Manufactures of iron and steel	1,855,532	2,349,566	2,128,712	1,320,091
Mineral oils	717,080	806,744	682,742	485,520
Phosphates	198,826	281,168	435,994	312,925
Cotton	259,225	331,652	248,345	298,877
Tin plate	143,610	261,899	294,382	224,291
Cement	280,032	379,968	412,347	206,483
Paper	183,263	224,276	259,314	202,478
Sulphur	207,257	238,231	215,831	190,690
Machinery	215,334	188,442	180,805	139,928
Coal and coke	252,740	227,883	224,439	122,179
Tobacco	78,943	129,433	118,322	116,946
Automobiles (exclusive of accessories)	124,553	250,688	203,089	104,002
Canned goods (fish, fruit, vegetables, etc.)	87,136	121,472	120,373	100,311
Textiles	124,658	137,886	120,750	94,254
Sugar	44,951	150,402	101,150	87,436
Ammonia	91,776	108,862	153,437	79,100
Railroad material	188,561	239,074	194,578	77,838
Scrap metal	48,168	83,829	196,676	46,904
All other	3,208,489	3,371,045	3,184,439	2,470,176
Total	8,310,134	9,882,520	9,475,725	6,680,429

Commodities transiting Panama Canal Atlantic to the Pacific.

Commodity.	Fiscal year ended June 30—			
	1928	1929	1930.*	1931
	Long tons	*Long tons*	*Long tons.*	*Long tons.*
Mineral oils	5,619,076	5,197,813	5,700,587	4,824,338
Lumber	3,673,832	3,311,875	3,530,879	2,747,485
Wheat	3,035,884	2,365,555	1,503,035	1,862,147
Ores (principally iron)	1,600,483	1,750,548	2,229,470	1,436,792
Nitrate	2,565,572	2,554,565	1,910,793	1,375,450
Sugar	577,781	717,931	920,399	1,033,013
Canned goods (fish, fruit, vegetables, etc.)	771,793	921,217	806,365	876,644
Metals, various	626,683	671,500	666,057	557,498
Food products in cold storage [1]	288,952	315,675	335,061	384,526
Fruit, fresh	93,457	211,854	144,860	286,049
Fruit, dried	272,644	304,956	206,384	282,791
Barley	237,262	260,142	275,064	235,364
Beans	127,168	154,782	112,679	171,335
Wool	167,931	150,712	145,071	157,129
Coffee	132,862	136,369	102,646	149,215
Flour	112,191	110,183	103,486	146,640
Rice	47,756	113,606	89,795	116,330
Paper	49,657	62,191	101,422	114,301
Copra	83,143	119,586	109,172	113,587
Pulp	14,734	49,623	108,861	109,163
Cotton	95,724	109,825	103,408	95,622
All other	1,125,990	1,189,978	1,348,993	1,326,952
Total	21,320,575	20,780,486	20,554,507	18,402,371

[1] Does not include fresh fruit.

Commodities transiting Panama Canal Pacific to Atlantic.

The fact that building construction in Shanghai has been proceeding on an unprecedentedly extensive basis during the past six months accounts in large measure for the increased imports during this period. The substantial drop in ocean freight rates also operated to hasten shipments on forward bookings during this period.

Canadian Valuation on Grape Imports.—On and after September 12, imports of grapes may not be invoiced at less than 5 cents a pound, if in bulk, or 7 cents a pound if in baskets or other packages. These values apply at production point, and grape imports will be subject to dumping duties if invoiced at lower values. Canadian duties against Pacific Coast fresh pears and apples are practically prohibitive.

Two Hopeful Signs.—As of September 15, Japanese idle tonnage totaled 271 vessels of approximately 203,000 gross tons, showing a slight improvement as against 219,000 gross tons in June last.

A wireless dispatch from London, published recently in the New York Times, announces that the Blue Star Line has recommissioned seven of its laid up liners. Four of these entered service early in September, the other three during October.

Heavy Sugar Crop in Hawaii.—The 1931-1932 sugar crop of Hawaii is now estimated to exceed 1,000,000 tons. The canned pineapple output will be about 13,-000,000 cases.

China Showing Improvements.—The United States trade commissioners from several Chinese centers report increased activity in trade. Silk sales to both Europe and America have improved somewhat and approximately 60 per cent. of Shanghai's filatures are now in operation with a good cocoon crop promised for this fall. During September, 75 American automobiles were sold to a new hire-car service in Shanghai. August exports of beans, bean products, and kaoliang at Dairen are much heavier than for the same period last year.

World Maritime Conference Called for 1933.—The International Labor Office at Geneva, which has already promulgated six international conventions dealing with maritime affairs, has announced that it has been found inadvisable, if not materially impossible, to convene its proposed world-wide conference on maritime questions wherein labor plays an important part.

Originally planned for a twelve weeks consecutive session in 1932, the conference would have clashed in point of time and interests involved with the World Disarmament Conference to be held at the League of Nations in Switzerland beginning February next. The governing body of the Labor Office has decided therefore to postpone the Maritime Conference from 1932 to 1933.

The six international agreements concerning maritime matters which have been drafted by the Labor Office to date are

(1) Minimum Age at Sea, with 22 ratifications
(2) Employment of Seamen, with 19 ratifications
(3) Minimum Age (Stokers), with 25 ratifications
(4) Seamen's Articles, with 13 ratifications
(5) Repatriation of Seamen, with 12 ratifications
(6) Prevention Dockers' Accidents, with 3 ratifications.

International Convention for Weight Marking of Heavy Package Freight.—Within a few weeks there will enter into force the International Convention respecting the obligatory marking of gross weights on sea shipments of heavy package freight. The figures will refer specifically either to pounds or kilogrammes.

The International Labor Office at Geneva announces that with the receipt of the Japanese Government's adhesion, the agreement will be registered inmmediately and included in the Treaty Series of the League of Nations.

It is a matter of moment, worth noting in passing, that the United States, though not a member state, registers all treaties, accords, and agreements with foreign countries at the League depository.

The object of the Weight-Marking Convention is to protect dock-workers against accidents due to overloading of cranes and other mechanical appliances used for lifting and lowering goods in the loading or unloading of vessels. As the result of a suggestion made by the German Government, the question was considered by the International Labor Conference in 1928 and again in the following year when, in spite of certain opposition from the employer's representatives, the Conference adopted the present convention.

The main operative provision requires that any package of one metric ton or more, consigned within the territory of any country which ratifies the Convention, for transport by sea or inland waterways, shall have its gross weight plainly marked on it before it is loaded on a vessel.

Notes on Marine Engineering Trends

High Pressure Steam Generators.—Constant improvement is being made both in America and in Europe in the design of high pressure, water-tube boilers, the tendency being toward the flash type. A Benson flash type experimental boiler installation was fitted about a year ago on a Hamburg-American cargo-passenger liner operating out of Hamburg to the River Plate. This steamer had four German water-tube boilers operating at 400 pounds pressure. The new boiler was put in the place of one of the old boilers. It generates steam at 3200 pounds, the critical pressure at which steam generated occupies the same volume as water. This steam is used in the turbine at 600 pounds pressure. It is claimed that for seven months operation this one experimental installation supplied all the steam necessary for the operation of the vessel.

On the basis of this and other experimental work, American and European marine engineers can see the day approaching when a flash-type boiler will surround the turbine to which it is supplying steam. The boiler and turbine being designed as a unit, mounted on the condenser and connected to the propeller shaft by either mechanical or electrical speed reduction equipment.

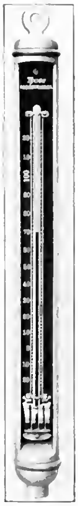
Testing Marine Engines.—Shop tests of marine engines—steam reciprocating, steam turbine, and diesel—have generally throughout the world been carried out on massive test blocks of very solid construction. A recent article on "The Navy's attitude toward American Diesels" by L. H. Morrison, published in the July 7 issue of "Power," makes the novel suggestion that marine engines should, like automobile engines, be tested on a shop block simulating as nearly as possible the more or less flexible and moving foundation upon which they are to operate in the ship.

Naval Fuel Economy Record.—The new British destroyer Acheron is equipped with high pressure steam boilers and geared turbines. On this vessel the boilers are of the Thornycroft, small tube, 3-drum, British Admiralty type redesigned for 500 pounds steam pressure and for superheating to 750 degrees Fahrenheit steam temperature. The turbines are 4-stage, single reduction gear Parsons, two units driving twin screws. On the full power trial, the fuel consumption was 0.608 pound of oil per shaft horsepower hour for all purposes on a water rate of 7.77 pounds per shaft horsepower, with the furnaces burning 0.785 pound of oil per square foot of total heating surface and with the turbines developing 34,000 shaft horsepower.

Acheron has a displacement of 1330 tons, a length of 312 feet, and a speed of 35 knots.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint



Ship hold thermometer.

Part XI — Thermometry

By L. L. Westling

YEARS of research have shown that each perishable article or product has its own best preserving temperature. But here again the marine carrier must make a compromise in providing cold storage space, for he may have a refrigerated cargo composed of fifty or more materials, each having a different "best" temperature, and with only two, three, or maybe four cold storage rooms in which to carry it. Hence he must skilfully classify as "cooler" 45 degrees Fahrenheit and above; "chill" 33 to 45 degrees Fahrenheit; "freezer" 24 to 32 degrees Fahrenheit; and "sharp freezer" 24 degrees Fahrenheit and below. The following table represents the best temperature for the more common items carried under refrigeration.

Best Cold Storage Temperatures

	Degrees Fahrenheit		Degrees Fahrenheit
Apples	32-36	Hams	35-40
Apricots	40-45	Lamb	30-32
Beef, chill	34-36	Lard	36-40
Beef, frozen	28	Lemons	36-40
Bananas	50-55	Lettuce	38
Berries	36-40	Milk	32-36
Butter	20-35	Milk, condensed	36-40
Cabbage	34	Mutton	30-32
Cantaloupes	34-38	Oleomargarine	25-30
Carrots	34-38	Oranges	32-35
Cherries	36-40	Oysters, tub	30-34
Cheese	32-36	Peaches	35-38
Cream	32-36	Pears	35-38
Currants	34-38	Peas	36-40
Eggs	33	Pineapples	50
Fish, fresh	25-30	Pork	34-38
Fish, frozen	12-15	Poultry, frozen	15-20
Game, frozen	15-20	Sausages	36-40
Grapes	34-38	Strawberries	36-40
Grapefruit	35-40	Watermelons	34-38
		Yeast	28

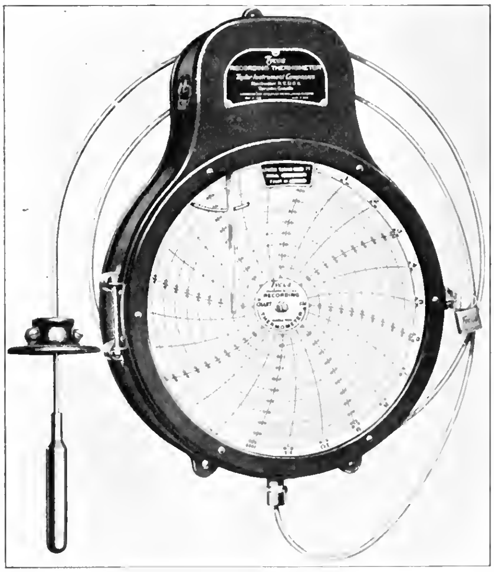
Some items, such as bananas, may be carried for many days without refrigeration, but they must have a well directed movement of air. Bananas require two cubic feet of air removal for every three cubic feet of space so ventilated.

Temperature Meters

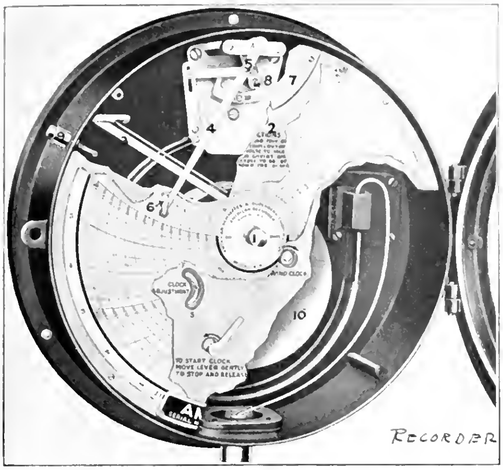
If a mercury thermometer is used it should be hung in the center of the cold storage space at half height, if possible. Should there be any suspicion as to the existence of stagnant pockets, the thermometer should be located accordingly. In chill or cooler rooms the thermometers should be placed in the suspected cold pocket, and in the freezer room in the suspected warm pocket.

Recording thermometers are indispensable. The recording mechanism of the instrument should be located outside of the refrigerated space, near the control valves, and should be well protected from mechanical damage. The bulb should be located near the warmest or the most representative location inside the refrigerated space. Preferably, it should be located against the deckhead at the center of the room. The bulb connection should be extended in hangers to clear the insulation by not less than one inch and should be protected from the cargo by a heavy, perforated metal casing. In large spaces, two or more thermometers may be used.

The operating personnel should make note of the differences between the recorder temperatures and the ship's hold thermometers and should indicate the cor-



A well known type of recording thermometer.



A recording thermometer with cover open, showing mechanism.

rection on the chart after removal from the instrument. Adjustment of the recorder should not be made by operators. Recorders should be frequently checked against calibrated thermometers at higher atmospheric temperature and by placing the bulb in an ice bath for the lower temperatures. Recording thermometers are particularly valuable in noting temperature changes in the space during the voyage, and all variations should be explained on the chart as to their cause. The chart is of great value to claim agents in establishing responsibility in case of cargo loss or damage. Written charts are a waste of ink and attendant's time.

Precautions on Delivery

Upon delivery of cargo, the carrier must insist on an early acceptance of refrigerated cargo. Certain perishables under refrigeration for extended periods frequently deteriorate rapidly after removal from the ship. It is the carrier's business to make certain that conditions do not arise at the port of delivery that may reflect unfavorably upon him. When entire contents of one chamber is destined for one point of delivery, it is often possible or advisable to regulate or shut off the refrigeration when approaching destination to permit a gradual temperature rise within the enclosed space, and thus minimize "sweating" of the cargo either on the ship or ashore. This requires careful control, and all fresh air inlets should be closed tightly. It is to the carrier's interest to require inspection of cargo immediately upon being placed ashore and to state a maximum period of time during which claims may be made against the carrier.

New Refrigeration Developments

There are now appearing some new developments in refrigeration which will later seriously affect methods of transportation of perishables. Most important of these are the several rapid freezing processes by which the perishable fruit, vegetable, or meat is frozen so rapidly that the cellular structure is not ruptured or in any other way injured and upon thawing the maturing and ageing processes are resumed where they were stopped upon freezing.

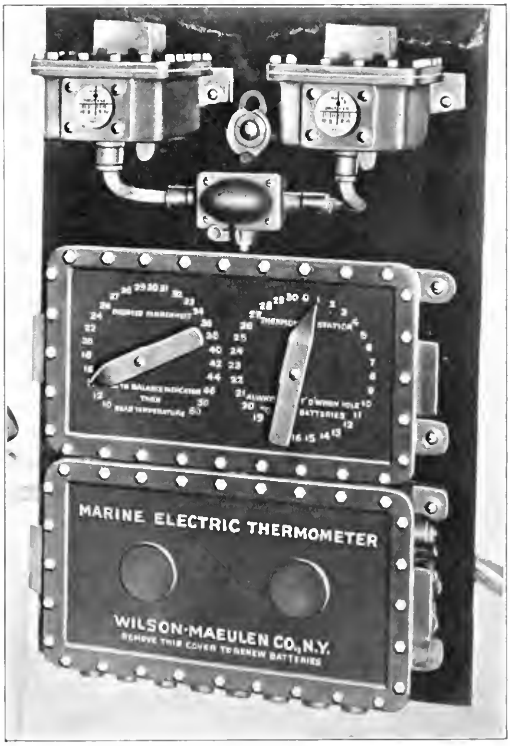
Ordinary chill refrigeration only retards maturing processes, while the new methods apparently arrest all changes. Under such conditions, the life of perishable foodstuffs as "fresh" material is endless if retained at proper storage temperatures. Perishables so treated are usually prepared ready for use in cooking or table consumption and are packed for shipment without waste materials, such as the pods on peas and the bones in meat.

These methods will obviously concentrate the food value of items which now carry large volume in waste materials, and the stowage space requirements will be reduced in proportion. However, the over-all consumption will increase and the ship operator will ultimately be benefited by this concentration.

The greatest effect upon ship equipment will be that lower temperatures, say from zero to five degrees Fahrenheit, will be a common requirement. This range of temperatures is lowerthan most ships are now equipped to provide. Refrigerated spaces should have not less than six inches, preferrably eight inches, of corkboard insulation or its equivalent to efficiently operate when carrying near zero temperatures.

Additional room coils will be necessary in most cases and, with the lower brine or gas temperature and the resulting low suction pressure, the capacity of the compressor and its associated units will be greatly reduced. This will require a reduction of most ships' refrigerated spaces, or additional capacity in the machinery end.

Errata.—On Page 419, October issue, fifth line from bottom of left-hand column, should read, "or **'cooler'** space."



Indicating station for electric thermometers.

Janus System Demonstration

An Interesting Test of Course Broadcasting by Whistle Control for Use in Foggy Weather

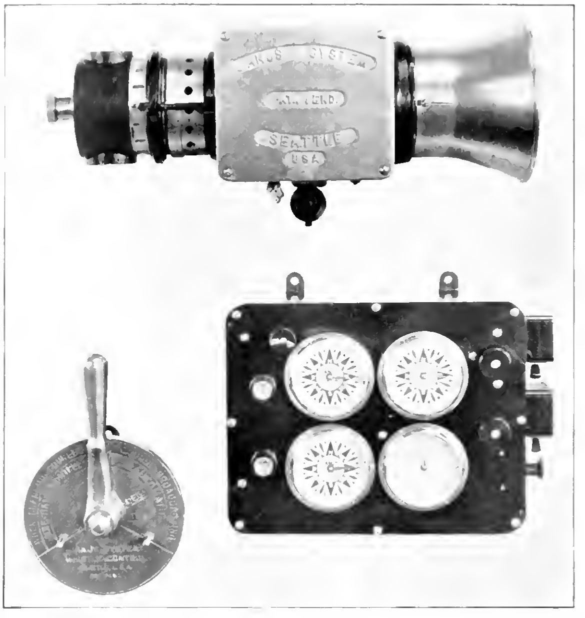
AN interesting demonstration of the practical use of the Janus System of broadcasting a ship's course in foggy weather to prevent collisions was held at San Francisco on the morning of October 3.

Investigations show that nearly 100 per cent. of collisions in fog are caused by one factor; that is, that when the captain of one vessel hears the fog signal of another vessel, he knows the approximate bearing of that vessel, but he does not know her course. A knowledge of both the bearing of the other ship and the course she is steering are essential.

Janus System, Inc. of Seattle, equipped two vessels operating in the San Francisco Bay area to demonstrate the practical use of this system before marine men of the port. The vessels equipped are the Slocum and El Aquario of the Army Transport Service. Through the courtesy of the general superintendent of the Army Transport Service at Fort Mason, Colonel Bennett, a number of representatives from local steamship companies had been invited to attend. As a result, experts were present from the Standard Oil Co. (of Calif.), Dollar Line, American-Hawaiian Line, United Fruit Company, Navy Department, and Army Transport Service.

This test was conducted in an area north of California City, the boats operating on various courses along the sides of a square and diagonally across the square. The distance between the boats was from one to two miles. The test, being conducted in clear weather, gave the observers an opportunity to see the maneuvers of the boats and presented a visual demonstration of the employment of the Janus System in fog. The results of this test, as shown in the tables herewith, prove conclusively that the Janus System can effectively broadcast the course of the ship upon which it is installed.

The apparatus consists of three parts, a pilot house control panel with four dials, a telegraph similar to an engine room telegraph which is used to broadcast regulation or towing signals according to the position of the handle and hand control signals as well, and the special Janus whistle in the conventional position on the stack.



The Janus whistle, control valve, and receiving and transmitting mechanism.

The control panel is similar to a telechron time movement: the intervals are timed by a small motor which is driven by the ship's electric current. The fluctuations of the current are compensated for by a sensitive governor. There is also an adjustment for retarding or speeding up the motor, which can be timed as accurately as a chronometer. When entering fog, the navigator of the ship can check the speed of the motor and adjust it if necessary. However, in practice it has been found that once the speed of the motor has been carefully adjusted by the installation men, no readjustment is necessary for a considerable time.

One of the most interesting features of the equipment is the Janus two-tone whistle, the sound being produced by a high speed rotor driven by a $\frac{1}{4}$-horsepower motor. It is more economical on steam consumption than the bell type whistle and has better penetrating qualities.

The Janus System uses a special two-tone whistle in order to distinguish a ship broadcasting her course in fog from a ship blowing her whistle according to the old method. As demonstrated during the test, mariners will have no difficulty recognizing a Janus whistle in fog when they hear it.

One of the most important features of this whistle equipment is the automatic towing signals built into the machine. The advantage of having towing vessels broadcasting their course in fog, thereby indicating in which direction the towline is pointing behind the towing vessel, is obvious. This should improve traffic conditions in fog to a considerable extent. In order to start the towing signals, it is only necessary to place the handle of the Janus telegraph at the mark indicated as TOW, and course broadcasting then proceeds in the usual manner.

Courses broadcasted by Slocum		Same courses as received on the El Aquario.	Courses broadcasted by El Aquario		Same courses as received on Slocum.
10.05 a.m. to 10.10 a.m.	SSE.	SE by S. SE by S. SSE.	10.04 a.m. to 10.13 a.m.	NNW.	N by W. N by W. N by W.
10.11 a.m. to 10.18 a.m.	ENE.	NE by E. ENE. NE by E.	10.14 a.m. to 10.20 a.m.	WSW.	WSW. SW by W.
10.20 a.m. to 10.28 a.m.	NNW.	NNW. NNW. NNW. NNW.	10.22 a.m. to 10.30 a.m.	SSE.	SSE. S by E. SSE. SSE.
10.29 a.m. to 10.36 a.m.	W by S½ S.	WSW. WSW. WSW.	10.31 a.m. to 10.37 a.m.	NNW.	N by W. NNW.
10.37 a.m. to 10.44 a.m.	SSE.	SE by S. SE by S. SSE.	10.39 a.m. to 10.45 a.m.	WSW.	W by S.
10.45 a.m. to 10.52 a.m.	ENE.	ENE. NE by E. ENE.	10.46 a.m. to 10.52 a.m.	SSE.	SSE. SSE. SSE. S by E. SSE
10.53 a.m. to 10.57 a.m.	NNW.	NNW. NNW.	10.53 a.m. to 11.00 a.m.	ENE.	ENE. NE by E ½ E. ENE.
11.00 a.m. to 11.11 a.m.	WSW.	SW by W. SW by W. WSW.	11.02 a.m. to 11.11 a.m.	WNW.	NW by W. NW by W. WNW.

Record of courses broadcasted and received by the vessels Slocum and El Aquario of the United States Army Transport Service during a recent test of the Janus Whistle System on San Francisco Bay.

For those not yet familiar with the way the intervals between whistle blasts are spaced, it is only necessary to explain that by the United States Inland Rule, which will be generally used, the intervals fall between 30 seconds and 60 seconds. These intervals are always one-half of those of the International Rule. Thus, a South course by International Rule would be 90 seconds, by Inland Rule 45 seconds. East by International Rule would be 75 seconds, by United States Inland Rule 37½ seconds, and so on.

Janus System officials explained that for all purposes of practical navigation when in close quarters in fog, it is only necessary to know a ship's course within limits of some fifteen degrees, taking into consideration the fact that in clear weather a navigator cannot tell the course of another vessel within such limits, unless directly ahead or astern of the other vessel in a direct fore and aft position. For timing the intervals, an ordinary stopwatch can be used, with a movement adjusted to 30 seconds for the United States Inland Rule. Thus, if one ship is equipped with the Janus device and the other is not, the ship not equipped can readily determine the course of the Janus equipped vessel through use of a stopwatch as above described.

From observations during the test it appears that very little practice is necessary to time the intervals correctly when receiving a course from another vessel. A slight personal error the navigator may make in using the stopwatch is of little consequence.

Officials of the Janus System explained that they prescribe the broadcasting of magnetic courses on their machines on account of the fact that the great majority of all types of vessels still employ the magnetic compass, although many ships are now also equipped with gyro-compasses.

Radio Newspaper Sent to Ships at Sea

A DAILY newspaper, especially prepared for radio facsimile transmission by the Schenectady Union Star, has been sent daily from General Electric's short wave station since July 30. This newspaper, printed in 10-point type on sheets 8½ by 9 inches, is compiled late in the afternoon and contains the latest news of the day. It is transmitted between 9 and 11 o'clock at night over apparatus developed by Dr. E. F. W. Alexanderson.

Reception of this radio newspaper is limited at present. Receivers have been installed by the Radiomarine Corporation on two transatlantic liners, the steamship America and the steamship Minnekahda, and another is being operated in Dr. Alexanderson's department in General Electric's research laboratory here, located about three miles from the transmitter.

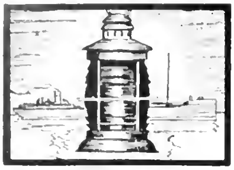
The receivers are known as the carbon facsimile recorders, developed a year or two ago by Charles J. Young, son of Owen D. Young, while he was an engineer connected with the company's radio department here. The receiver is no larger in size than the ordinary suit case. It prints an exact copy of the page sent on a roll of paper which automatically moves through the machine at the rate of about an inch a minute. It prints by carbon, an advantage over earlier facsimile machines where photographic developing of the page was required before it could be read.

The facsimile transmitter, used in sending the page, was developed in the company's radio laboratory at Schenectady, New York, by Dr. E. F. W. Alexanderson. It is located in the company's short wave radio station at South Schenectady. An Alexanderson directional antenna is used, such as was developed for the company's radio broadcasts to Admiral Byrd when he was at Little America. This increases the transmitted signal strength about twenty fold.

Trade Literature

Radiobeacon Navigation. — The application of radiobeacon signals to the safe navigation of passenger and cargo vessels is described in a new pamphlet just issued by the Lighthouse Service, of the Department of Commerce. Outlining its system of radiobeacons, covering all coasts of the United States, and explaining the manner in which such signals are broadcast, the Lighthouse Service goes on to illustrate the many applications of such signals to navigation. Originally designed to aid vessels in time of fog, radiobeacons have now come to be recognized as all-weather aids to navigation and also as having special significance in rescue and other emergency work.

The new radiobeacon pamphlet is being issued on the tenth anniversary of the first placing in regular service of radio beacons. Developed just prior to the World War, these signals were first applied in a practical way off the entrance to New York Harbor, in 1921. In this ten-year period, the system under the control of the Lighthouse Service has been expanded until there are now more than ninety stations protecting the waters of the Atlantic and Pacific coasts, the Great Lakes, Hawaii, and the Panama Canal.



Marine Equipment

ELEVATOR TRUCKS ~ PUMPING UNITS
LIFE BOAT RADIOS ~ PAINTS and ENAMELS

New Los Angeles Harbor Pilot Boat

BUILT by Al Larsen of Terminal Island, Los Angeles Harbor, and fitted with complete propulsion and auxiliary power plant by Fairbanks Morse, the Helen C. Porter, new boat for the Los Angeles Harbor Pilots, was delivered October 1st after successful tests of hull and machinery.

The Helen C. Porter is of sturdy Oregon pine construction with deck house of teak. She has four steel bulkheads, located at frame numbers 10, 23, 29, and 35, dividing the hull into five watertight compartments. Her principal characteristics are:

Length over all	64 ft. 11½ ins.
Length on water line	60 ft.
Beam over all	16 ft. 5¾ ins.
Beam on water line	14 ft. 6 ins.
Beam molded	14 ft. 10½ ins.
Depth molded	6 ft. 10½ ins.
Draft, mean to bottom keel	6 ft. 6½ ins.
Displacement	61 tons

The engine room space is 19 feet 6 inches long, and as all fuel, fuel service, air, lubricating oil, and fresh water tanks are located in a separate tank compartment aft of the engine room, there is ample room to make a good lay out of machinery with all working parts fully accessible.

The propulsion unit is a six-cylinder 10″ x 12½″ fully reversible new type open head combustion Fairbanks Morse diesel with crank case scavenging and with integral circulating and bilge pumps. This engine delivers 210 brake horsepower at 260 revolutions per minute and drives the hull easily at 12 miles an hour sea speed.

The engine is at all times under complete pilot house control by the Fairbanks Morse mechanical system.

The auxiliary power unit is a one cylinder 5″ x 6¼″ Fairbanks Morse diesel combination unit with an F.M. 10 cubic foot two-stage air compressor on one end and an F.M. 5 k.w. direct current generator on the other end.

This electric generator is supplemented by a 110-volt, 138-ampere hour Exide Iron Clad storage battery. The wiring and electrical installation, including switchboard, was by Ets Hokin and Galvan of San Francisco and Wilmington.

Helen C. Porter has to be at sea in any kind of weather, and special care was therefore taken to insure dry bilges in all compartments.

The bilge pump on the main engine drains the bilges of each compartment through separate suction leads. In addition there is installed a 1¼ inch Fairbanks Morse centrifugal fire and bilge pump driven by a three horsepower motor. This pump draws from a suction manifold which in turn is connected by separate suction to each compartment and to the sea. The discharge is either overboard or to fire hydrant outlets on deck.

The after end of the deck house is fitted up for comfortable accommodation of the pilots with a separate compartment at the forward end fitted as a lavatory. Fresh water is circulated by a Fairbanks Morse 210 gallon Home automatic electric water plant which keeps the pressure at 35 lbs.

Altogether Helen C. Porter is a well-found, seaworthy craft with ample engine power, and will be a very useful piece of equipment in the outer harbor of Los Angeles.

The Helen C. Porter on her trials in Los Angeles Harbor.

Elevator, Chisel-Type Truck

By C. B. Cook

FOLLOWING the early application of a pair of forks to the front end of an electric lift truck platform, the demand has developed for ever increasing capacity. Elwell-Parker has recently developed a 6000-pound capacity machine for this purpose.

This truck is built to accommodate either a battery or gas-electric unit for power purposes, all operating safety features being retained in the gas-electric and the electric controller avoiding the use of either clutch or transmission, eliminating much wear and tear on the equipment with a consequent assurance of continuous operation.

The truck is driven by motor through worm and gear; all power transmission parts between motor and wheel are heat-treated alloy steel except the phosphor bronze worm wheel. The drive wheels are the largest used on electric industrial trucks, 22 inches in diameter. The power plant is three-point supported to accommodate it to uneven runways.

The trail axle is of the knuckle type and its 15 by 7 inch wheels steer as do those on the drive axle, so that the truck may be maneuvered in congested quarters by means of the hand wheel steer. This axle is centrally pivoted so that the load forks in front of it are level even though the wheels are not on level floors.

The forks are made in various lengths and with varying spreads to accommodate any material from bundled sheets, cased automobiles, and boxed machinery to loaded skids or skipboards, barrels, bales, and slings. After the forks are thrust under the load, it may be tilted back 30 degrees in a sufficiently inclined position to carry safely to destination where load may be elevated five feet for tiering. When higher tiering is necessary, the uprights are made longer so that the fork carriage which travels between them may rise to greater heights. Where headroom is restricted as in cars or through doorways and it is desired to tier loads to great heights telescoping uprights will be furnished.

The tilt and hoist features are accomplished by one unit. The lift is by cable while the positive tilt is by rack and pinion drive. This rack type provides for a positive forward tilt of uprights of several degrees. Automatic limit switches are used throughout.

This machine is the ninth of a series of fork trucks. In addition to having 6000-pound capacity, it retains all the flexibility of the 1000-pound type.

The new Elwell-Parker 6000 pounds capacity elevator chisel truck.

Monobloc Pumping Unit

THERE long has been a need in all industry for a centrifugal pump of good efficiency, low initial cost, and low maintenance expense, the design and construction of which is such as to insure good service with but little care and attention. This need now is met by the Monobloc (Type D) centrifugal unit recently placed on the market by the Worthington Pump and Machinery Corporation.

The pump, simple and rugged, is bolted to the extended motor frame and the impeller is mounted on the end of the continuous motor shaft. The bronze impeller incorporates the shaft sleeve as an integral part, this construction being one of Worthington's latest shaft protection developments. The special cadmium-plated steel locking device for the impeller, the forged bronze packing gland, and the arrangement of shaft water-throwers are other important features of this pump. Commercial capacity ranges from 10 gallons per minute at 15 foot head to 140 gallons per minute at 85 foot head.

The ball bearing Masterbilt motor, designed especially for Worthington, incorporates standard electrical construction. Combined with the pump, it affords a high-class, moderate-priced pumping unit for the services for which it is intended. Motors on commercial size pumps range from 1½ to 5 horsepower. The applications of this new unit cover all uses on shipboard within the listed capacity ratings.

The simplicity and thoroughness of the design of this new unit is the result of Worthington's many years of experience in Monobloc construction in the higher price field. All the important features found necessary in units of this type have been incorporated to perfect a smoothly running and reliable electric pump.

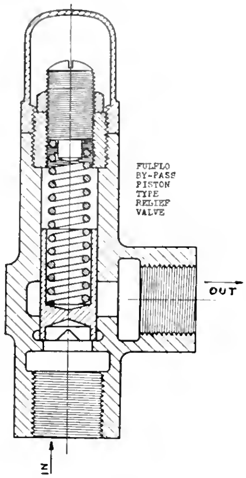
New Oil Relief Valve

A NEW non-chattering piston type oil relief valve, or by-pass, is being manufactured and marketed by Fulflo Specialties Company.

This valve is made in pipe sizes from 3/8 to 1 1/4 inches and is suitable for pressures from 20 to 120 pounds. Adjustment can be made by removing cap and turning adjustment screw at top of valve. The cylindrical piston seat closes off the port in a shearing manner and does not seat abruptly against the body of the valve, thereby relieving the pounding or chattering noise ordinarily caused by standard valves using a disc seat.

An important use of this valve is in connection with oil hydraulic pumping units where a specific pressure is desired to be maintained such as on marine oil burning equipment.

They are constructed either of cast iron with brass piston or in all bronze construction.



These valves require no attention when once installed and set for the desired pressure.

Radio Equipped Lifeboats

WHEN the palatial new Matson-Oceanic liner Mariposa, which is now under construction sails on her maiden voyage early next year she will be equipped with radio facilities as complete as any steamship has ever possessed. She will have powerful radio telegraph apparatus of world-wide range and a centralized radio system for the convenience of reproducing radio broadcast programs at various locations in the vessel.

One of the modern innovations will be the radio equipment for lifeboats, as developed by the Radiomarine Corporation of America. The design and construction of this new equipment is considered an engineering achievement not only because such apparatus must represent the utmost in reliability but also because its service must be accomplished under difficult conditions and with limitations not usually encountered in other applications of radio. As outlined by C. J. Pannill, executive vice-president of the Radiomarine Corporation of America, the newly developed apparatus for this purpose will include the following features.

This new equipment had to be designed for minimum space and to be of the least possible weight. It had to be completely protected from water and the corrosive action of salt air. It must have flexibility of operation on short waves as well as the intermediate band and a reliable transmitting range of at least a hundred miles.

Storage batteries provide power for operation; and the radio equipment of every lifeboat so furnished will consist of three units; namely, the transmitter and receiver containing the vacuum tubes and the tuning apparatus, a charging panel by means of which power is controlled, and a motor-alternator for the production of high voltages necessary to the operation of the vacuum tubes. All of these units are proof enough against weather and water that they may even be completely submerged for a time without damage to the apparatus.

The receiver employs 2 tubes for head-phone operation. It is simple in circuit design, with a minimum number of component parts for compact sturdiness, yet its range is more than adequate for the purpose of its application. Two tubes in all are used in the transmitter, which is rated at about 15 watts. On the intermediate frequency band the transmitting range will be in the neighborhood of 50 miles and on the short wave or high frequency band it should not be difficult to establish reliable communication over distances of 100 to 200 miles, and even much further under certain conditions.

The control panel serves a multiplicity of functions. It provides means of connecting the storage batteries with the ship's lines to keep them fully charged when the lifeboat is in its normal location in the davits. When the lifeboat is afloat it provides means for turning on the power for the radio, for controlling illumination within the boat, and for the control of a searchlight with which the boat is equipped. The facilities of this switchboard also make it possible to connect the radio telegraph key with a light on the boat for visual signalling by means of the telegraph code.

One of the features of this equipment which makes for its compactness is the use of the same tubes and apparatus for operation on the two widely separated frequency bands. It is only comparatively recently that marine apparatus has been produced that would incorporate this convenience and economy and yet meet the extremely rigid requirements which are imposed for great reliability of operation. The advent of this apparatus makes possible the design of lifeboat radio equipment of such compactness and efficiency.

Trade Literature

How to Speed Cargo Handling is the title of booklet just published by **The Elwell-Parker Electric Company** of Cleveland. Illustrated with over 50 photographs of cargo handling in ports all over the world, this booklet contains many valuable suggestions to the marine official who must see that cargoes are loaded and unloaded most efficiently. The importance of modern handling methods is discused with ways and means suggested for using modern electric industrial trucks at docks as well as on cargo ships themselves. Copies of this valuable little booklet may be obtained from the builders of E-P electric trucks or from the Editorial Department of this magazine.

Dulux Paints and Enamels

By C. F. Rassweiler and J. W. Iliff*

WHILE the paint, or finish, industry is one of the oldest and its beginnings may be traced back for many centuries, it has in recent years been shown that this important industry is peculiarly susceptible to development. Progress along the lines of distinctly different finishing materials is among the most significant advances made in the diversified chemical manufacturing field.

Rather recently there has been made available a radically new type of finish which possesses remarkable durability and flexibility. This really revolutionary product, called Dulux, has been developed through years of experimentation and trial by the du Pont Company. Its marked departure from the finishes hitherto used lies in the fact that it contains a synthetic vehicle which replaces the linseed oil commonly used in high grade paints.

Interest in Dulux in the marine field is evident from reports received on the performance of Dulux as a finish for the hulls of ships and for painting the exteriors of superstructures, as well as for all interior finishing. Likewise, the holds of a number of ships have been painted with Dulux.

There are two factors which contribute to the quality of any finishing material: first, the pigment, which gives color, hiding power and body; and, second, the vehicle, which holds the pigment particles in place and forms a continuous adherent film. Past experience, based on large numbers of exposure tests, has shown that the vehicle of a paint, varnish, or enamel is the first of these two components to disintegrate. Yet far greater attention has generally been given to the selection of pigments and pigment combinations than to the vehicle, with the result that the durability of ordinary finishes has always been definitely limited by the lack of durability in the commonly available vehicles.

While our chemists have spent many years in pigment development, they have studied, too, the other half of the problem involved in improving finishing materials, with the result that new vehicles of radically different characteristics and greatly increased durability have been developed. These vehicles hold the pigment in place without disintegration for a much longer time than was possible with the materials formerly used.

For interior and exterior enameling, Dulux gum vehicle is used, while Dulux oil vehicle is employed for interior and exterior painting. Neither form is like the oils, gums, and brittle synthetic resins generally utilized in paint manufacture. They are distinct chemical compounds, the result of scientific chemical processes and can be manipulated to meet application and durability requirements for almost any purpose.

The Dulux vehicles are not varnishes. The oil vehicle, although oil-like in nature, dries faster than the natural oils, and on actual exposure without pigment has shown much greater durability than former paint vehicles. The gum vehicle shows much greater retention of flexibility than ordinary enamel vehicles and on exposure without pigment is more durable than either oil or varnish.

When combined with pigments, these new vehicles naturally result in finishes of outstanding durability. Finishes based on Dulux oil are used in places where linseed oil or chinawood oil paints are now commonly used and in general wherever resistance to weathering and corrosion are desired combined with retention of original appearance. Finishes based on Dulux gum are designed for use in places where durability must be combined with faster drying and greater hardness and where finishes of enamel-like appearance are desired.

Exposure tests have shown that Dulux finishes seldom check or crack but fail gradually by slow chalking, which starts at a later date and proceeds slowly. Exhaustive tests indicate probable protection of the surface from 50 to 100 per cent. longer than that obtained with present day high grade products, provided the previous coats of other materials have not disintegrated so far as to prevent proper adhesion.

Dulux finishes have remarkable retention of color and gloss and so hold their initial appearance for an unusually long time. They are extremely resistant to gases, fumes salt air, and other deteriorating agencies encountered in marine painting. The finish is very resistant to the passage of moisture, and this, combined with resistance to checking and cracking, makes it an excellent finish for preventing the corrosion of metal surfaces.

Ease of application is always a point of interest. When used in a spray gun, Dulux atomizes freely but still has enough body to adhere to vertical surfaces without sagging, breaking, or running. It is also practical for brush application.

When a deep, enamel-like luster of exceptional hardness is required, together with quicker drying, Dulux vehicle in gum form is used. This differs radically from the usual rosins, fossil gums, and common synthetic resins. It is elastic and pliable, almost "rubbery," and imparts to the finished product unusual elasticity and adhesion in a finish that is exceedingly difficult to mar.

The quality of the film obtained with the gum vehicle is unique in finishing materials. It resembles ivory closely in feel and hardness and retains its gloss over a long period of time. Because they are so exceptionally hard, these finishes do not readily scratch or mar. The surface has unusually smooth, silky texture and can be produced in any degree of gloss.

Even though the gum vehicle gives a hard surface, it is flexible when first applied and remains so to an unusual degree. Consequently it does not crack or chip after long periods of aging.

Dulux for enameling is readily adaptable to spray or brush application, and for small objects the dipping method can be satisfactorily employed. It brushes out easily and flows out on the work without leaving marks. A full bodied, high gloss finish can be obtained in two coats.

For a colored finish, Dulux is extremely resistant to heat. It has been used on machinery continually subjected to temperatures up to 300 degrees Fahrenheit. Its retention of color, elasticity, and adhesion under these strenuous heat conditions is remarkable.

*Central Technical Laboratories, E. I. du Pont de Nemours & Co.

Modernizing Three Battleships

A CONTRACT for new geared turbine propelling machinery for the three battleships, New Mexico, Mississippi, and Idaho has been awarded recently to the Westinghouse Electric and Manufacturing Company by the United States Navy Department at a price of $1,-395,632.

The propelling equipment for each battleship consists of four 10,000 shaft horsepower, cross-compound, impulse reaction turbines with single reduction gears designed for a propeller shaft speed of 250 revolutions per minute.

Each of the four 5100 square feet, single pass, all welded steel underneath type surface condensers with welded steel shell and cast iron water boxes serves as a foundation for one main turbine.

Eight 2-stage, vertical, propeller-type lubricating oil pumps, each with a capacity of 450 gallons per minute, supply oil to all bearings when the propelling machinery is operating below 12 knots, while the ejector system is used for lubrication when operating at all speeds above 12 knots. The lubricating oil is properly cooled by eight 400 square feet welded steel, single pass, lubricating oil coolers.

In addition, there are eight 2-stage air ejectors, each mounted on a common inter- and after-condenser, and four main turbine-driven propeller-type circulating pumps, each with a capacity of 12,-500 gallons per minute, mounted in the condenser water boxes. Each of the main condensers is served by a turbine-driven condensate pump of 300 gallons per minute capacity and a motor driven condensate pump of 50 gallons per minute capacity. The turbine-driven condensate pumps are used when the ship is operated at full speed, and the motor-driven condensate pumps are operated at all speeds below full speed.

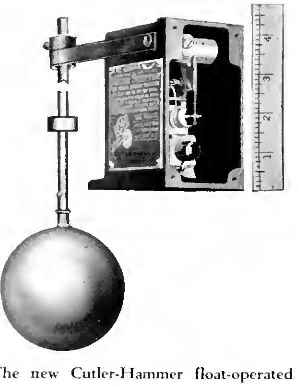
The Navy Department's decision to install geared turbines of the same design and manufacture in all three ships is expected to result in a saving of approximately $300,000. This power plant contract is only one item in the modernization of the three battleships which was authorized at the last session of Congress, at an estimated total cost of $30,000,000.

The New Mexico is at the Philadelphia Navy Yard and the Mississippi is at the Norfolk Navy Yard for modernization.

The Idaho arrived at the Norfolk Navy Yard October 1 for modernization. Most of the equipment which is to be furnished by Westinghouse will be built at the South Philadelphia Turbine Works.

Float-Operated Starting Switch

FOR small alternating current and direct current motors on bilge pumps, tank service, and similar application, the new float-operated motor starting switch announced by Cutler-Hammer, Inc.,



The new Cutler-Hammer float-operated motor starter.

provides across-the-line starting, thermal overload protection, and is small in size. For larger motors, this same device can be provided without overload protection so it can be used as a master switch in the control circuit of a separate automatic starter. It can also be furnished without the float accessories for use as a lever operated master switch.

This is a single-pole starter with double break, silver contacts to assure continuous current carrying capacity. Contact mechanism is quick make and break. The operating lever and shaft are reversible in the case, and the operating lever can be shifted to any angular position of the shaft, so either tank or sump operation can be obtained with the starter mounted in any position.

The thermal overload relay protects the motor from burn-out and prevents unnecessary blowing of fuses. It is free tripping; the switch cannot be held closed on an overload. When the overload trips, it is necessary for someone to go to the switch and return the operating lever to the full "off" position to reset the overload. This means the operator will also check the cause of the overload and clear the trouble before restarting the motor.

Maximum ratings for this float-operated motor starter are alternating current, 1/2 horsepower, 110 or 220 volts, single phase; direct current, 1/6 horsepower, 115 volts.

New Radio Clock

MARINE radio now has its own type of clock, developed according to the requirements of the radio room on shipboard. It is described by Charles J. Pannill, vice-president and general manager of the Radiomarine Corporation of America.

"A large second hand passing over certain colored areas of the clock's face enables the operator accurately to subdivide minutes into four-second intervals," said Mr. Pannill. "This is to assist in sending out signals of exactly four seconds duration in emergency. Such signals, separated by silent intervals of one second, will operate automatic devices in ships within range and call radio operators to their posts if they should not be on watch. Another colored section of the clock's face marks off three minutes following the quarter hour and three minutes following the three quarter hour. This serves as a reminder that operators are required by law to devote these stated intervals of time to listening only, on the 600 meter distress wave length, in order to pick up any emergency calls which may be transmitted from ships in distress.

"Simple as the new device may seem from this description," continued Mr. Pannill, "it is really a distinct contribution to the accurate transmission of signals which operate automatic alarms on other vessels. It is much easier to measure a four-second interval by a sweep second hand than by one which measures the seconds on a small dial."

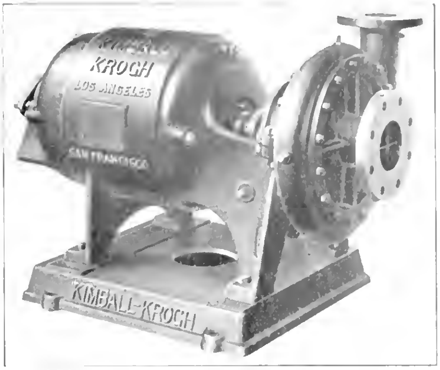
Compact Pumping Unit

SINCE the merger of the Kimball-Krogh Pump Company with the Victor Welding Equipment Co., the joint engineering staffs have devoted their entire time and effort towards the perfection of already existing Kimball - Krogh pumps and the creation of additional pumps for the ever increasing pump requirements in the marine field or wherever the conventional, direct-connected pump and motor have previously been used.

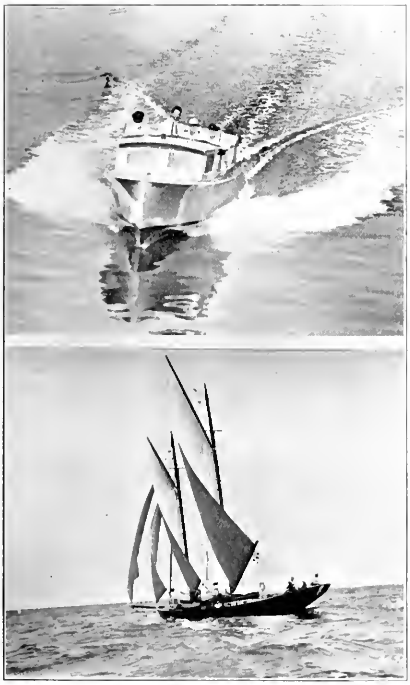
The small compact Kimballectric pumps with capacities from 60 to 400 gallons per minute have proved so efficient that a large demand has been developed for similarly constructed pumps of large capacity. This demand has now been met by the development of the "large" Kimballectric pump.

Model L.K.E. of this type is now available in sizes from $2\frac{1}{2}$ inches to 8 inches, inclusive, with capacities from 200 to 2500 gallons per minute, and for heads from 10 to 150 feet. The motors driving these pumps were built for 60- or 50-cycle alternating current service and will operate at nominal speeds of 1760 and 1160 revolutions per minute on 60 cycles, and of 1460 and 960 revolutions per minute on 50 cycles.

The particular advantages of these new "large" Kimballectric pumps lie in the fact that they establish a saving of 20 per cent. in initial cost, require 50 per cent. less floor space than the split shell horizontal pump, need no flexible coupling, practically no lubrication, and every working part is instantly accessible.



This cut shows the compact design of the new Kimballectric pumps for capacities up to 400 gallons per minute.



TWO STERLING CRAFT.

The upper illustration shows the Fellowship a smart cruiser designed and built by Fellows & Stewart of Wilmington, California, for James G. Rossback of Hollywood. 30ft. 9in. by 7ft. by 1ft. 3in. draft, her Sterling "Petrel" drives the hull at 30 miles an hour.

The lower illustration features Yawin, a 63ft. schooner yacht built by the Burger Boat Company for E. M. Murphy, of Greenbay, Wisconsin. For auxiliary power she has a Sterling "Petrel" reduction gear engine.

Handy Floodlight

A NEW and larger handy floodlight, the "Senior," designed for general-utility floodlighting and employing a 200-watt incandescent lamp, has been announced by the General Electric Company. Offered as a supplement to the 100-watt handy floodlight projector, the new "Senior," smaller and less expensive than the standard floodlighting projectors, is expected to find new uses on wharves, piers, and shipboard where light requirements do not necessitate the larger, standard floodlighting units. Giving double the amount of light obtained from the smaller 100-watt handy, it will fulfill requirements where a higher intensity of illumination is desired.

The new "Senior" weighs approximately six pounds, measures less than 15 inches in height with its supporting stand, and has a depth of $12\frac{1}{2}$ inches from the center of the lens to the tip of the lamp holder. The diameter of the special heat resisting lens measures 10 inches. A 200-watt inside-frosted general - service incandescent lamp with a 6-inch light center and medium screw base is used.

The new unit is composed of a sheet aluminum combination casing and reflector, pressed together with a separately drawn socket-supporting cap over a supporting ring. The casing is polished inside, forming the specular surface for reflecting purposes.

A rubber-covered twin-conductor lamp cord is woven through a rubber bushing affixed to the socket-supporting cap to prevent entrance of moisture and abrasion of the cord.

Trade Notes

Active Marine Equipment Agency.—Roland E. McCune, president of the firm bearing his name, which is one of the fastest growing marine equipment and engineering supply houses on the West Coast, announces that the Roland E. McCune Company has been appointed representative for the E. J. Willis Company of New York. The Willis line is marine hardware, motorboat, and yacht specialties.

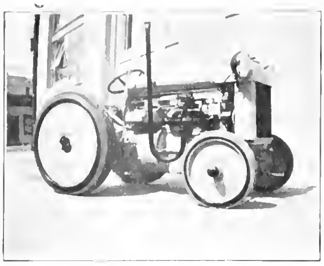
Roland E. McCune, established his business in San Francisco one year ago, after having served twelve years as assistant purchasing agent for the Bethlehem Shipbuilding Corporation, Ltd. In the brief space of time he has expanded his marine equipment and supply business over the entire Pacific Coast, and his list of products include the Bridgeport Screw Company; Matthiessen & Hegeler Zinc Company; Rostand Manufacturing Company, makers of brass airports; the Caldwell Manufacturing Company, marine sash balances; the Star Compass Company, marine and aeronautical compasses; Rochester Can Company; and the Klein Logan Company. The McCune organization is also distributor from local warehouse stock of wire hull brushes and drydock paint and varnish brushes.

Los Angeles offices of the house are located at 1026 Bank of America building, in charge of L. B. Morris, formerly sales manager of Bethlehem Steel Company. The Seattle branch is in charge of Walter B. Jones and is situated in the Smith Tower.

Industrial Fordson in Marine Field.—The Tynan-Alexander Motors, Ltd., of San Francisco has recently been appointed Industrial Fordson representative in the San Francisco Bay district.

The Fordson tractor, as applied to materials handling in industries, in warehouses, in shipyards, and on piers, is a very compact, efficient, low-cost unit for which many accessories and fittings have been carefully designed to make it especially applicable to specific tasks. These fittings include crane attachments for lifting, transporting, or tiering heavy pieces, and special industrial front and rear plate bumpers for use in shunting and shoving trailers, spotting railroad cars.

The large users of the Industrial Fordson on the piers of San Francisco Bay include the Luckenbach Steamship Company, the California Stevedore and Ballast Co., the Charles Nelson Co., Captain Freemont R. Nash, Shirmer Stevedoring Co.



Fordson industrial tractor.

Repeat orders from these firms attest the satisfactory service given by Fordson tractors.

Equipment Firm Moves West.—In order to render closer and more complete service to the Pacific Coast shipping and oil industries, Fred. S. Renauld, president of the firm bearing his name, is now perfecting arrangements to move his entire plant and organization to the Pacific Coast. The Fred. S. Renauld & Company line, heretofore manufactured in New Orleans, will locate in the Los Angeles territory. The products are power auxiliaries and specialties for the marine, industrial and domestic fields. In San Francisco the representatives are the C. E. Rhodes Company, and in Southern California the Marine Engineering & Supply Company of Wilmington, are agents. Northwestern representatives are to be appointed at a later date.

Firm Carries Line of Packing.—R. W. Giddings Supply Co. of San Francisco, distributor of Johns-Manville materials for a number of years, announces that this firm is now stocking Johns-Manville Sea Ring telemotor packing. This packing has been on the market for some time and has proved itself efficient wherever it has been installed.

Sea Ring telemotor packing is of unique design, automatic in action, and is said to generally outlast any other packing. Depending on the nature of the service, Sea Ring packing is made of asbestos fabric or duck, or of a combination of the two, impregnated with heat and other service resisting materials selected to meet the specific conditions.

In addition to this telemotor packing, the R. W. Giddings Supply Co. handles the following Johns-Manville products:

Rod and Plunger packings.
Piston packings
Flax and jute packings
Sheet packings
Gaskets
Asbestos rope
Asbestos wick
Asbestos cord
Pump valves

New Chairman of Board.—The Board of Directors of Worthington Pump and Machinery Corporation has announced the election of LaMonte J. Belnap as chairman of the executive committee of that corporation. Mr. Belnap is succeeded as president by Harry C. Beaver, formerly vice-president.

As chairman of the executive committee, Mr. Belnap maintains his active part in directing the manufacturing, sales, and financial activities of Worthington. President also of the Consolidated Paper Corporation, Ltd. LaMonte J. Belnap has an international reputation as an industrialist and financial organizer.

In the selection of the new president, Mr. Beaver, Worthington is equally fortunate. Mr. Beaver has been associated with Mr. Belnap in various enterprises for the past 25 years.

Engineering Departments Merge.—The Marine Engineering Group, General Engineering Department of the Westinghouse Electric and Manufacturing Company, has been merged with the Steam Engineering Department at the South Philadelphia Works. This group will remain at the East Pittsburgh plant and will continue under the direction of H. C. Coleman, who has been appointed section engineer.

Executive Changes Job.—It has been announced by Westinghouse that Carl J. Lamb has resigned as manager of the Marine (Steam) Apparatus Sales Department of the Westinghouse Electric & Mfg. Co. to accept an executive position with the Sharples Specialty Company of Philadelphia, manufacturers of Super-Centrifuges for land and marine applications.

American Shipbuilding

Edited by H. C. McKinnon

Maiden Voyage of Talamanca Scheduled. — The steamer Talamanca, first of six vessels building for the United Mail Steamship Line of Boston, subsidiary of the United Fruit Company, is scheduled for operation on the Pacific Coast and will arrive in San Francisco on her maiden voyage on January 14. The vessel is nearing completion at Newport News Shipbuilding & Drydock Company and is scheduled to sail from New York on December 23. A special passenger cruise is being arranged to include stops at the ports of Miami, Havana, Kingston, Panama Canal, Los Angeles Harbor, and her West Coast base at San Francisco. The advent of the vessel is causing quite a stir of interest at California ports, as the new fleet of three vessels for the Pacific Service of the United Fruit Company will mark a great improvement in this class of passenger travel, as well as refrigerated cargo transport to and from Central and South American ports.

Destroyer Contracts Awarded. — The Bath Iron Works, Bath, Maine, has been awarded contract for one destroyer for the United States Navy on its bid of $2,626,000 and delivery in 30 months. This was the lowest bidder for the building of a destroyer by a private shipyard in accordance with the Navy Department's design.

Bethlehem Shipbuilding Corp., Ltd., Fore River Plant, Quincy, Mass., has been awarded contract for the construction of one destroyer, on a bid of $3,034,500, which is the lowest bid submitted by a private shipyard in accordance with the bidder's design. Delivery is scheduled for 26 months.

Contracts for one destroyer each have been awarded to the Boston Navy Yard, and the Bremerton Navy Yard.

The above four awards, together with the destroyer already under construction at the New York Navy Yard, bring the total up to five. There is a balance of seven destroyers authorized by Act of August 29, 1916, for which there are no funds available at the present time for their construction.

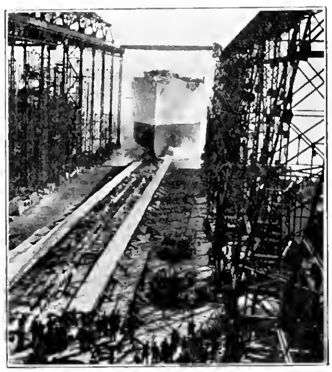
Repairs to Freighter.—The St. Helens Shipbuilding Co., Portland, Oregon, was awarded contract last month for collision damage repairs to the steamship Ernest H. Meyer, which collided with the German steamer Schwaben. The work consisted largely in replacing plates on the port bow.

To Alter Algonquin for Salvage Work.—The Foss Co., Inc., of Seattle and Tacoma, leading towboat and salvage firm of Puget Sound, has purchased the famous U. S. Coast Guard cutter Algonquin and brought her to Seattle, where the company plans to equip the vessel for salvage work. The equipment to be installed will be pumps, towing machine, and other salvage equipment, and new navigating equipment. Wedell O. Foss, president of the company, stated that he plans to make her the most powerful American salvage tug on the Pacific Coast with sufficient cruising radius to take her to the Hawaiian or Aleutian Islands.

Bids Asked On Large Pleasure Craft.—A 125-foot pleasure craft for a Pacific Coast owner has been designed by G. Bruce Newby, naval architect, at 524 West Sixth Street, San Pedro, California, and bids are being requested from Pacific Coast builders for construction of the craft.

Mississippi River Barges to be Ordered.—The Mississippi Valley Barge Line Company, 1003 Cotton Belt Bldg., St. Louis, Mo., is reported to be contemplating the award of contract for the construction of from ten to forty steel barges for river service.

New Lighthouse Tender Planned.—The Bureau of Lighthouses, Department of Commerce, Washington, D. C., is said to be preparing



Above are shown two views of the launching of the Matson-Oceanic liner Monterey at the Fore River Plant of the Bethlehem Shipbuilding Corp. which took place October 12. At right the Monterey is seen sliding off the ways. At left is a view of the bow of the vessel at the outfitting wharf. At the extreme left is her sister ship, the Mariposa, which will be ready for service about January 1.

plans for the construction of a lighthouse tender of the Aster class for service in the coastal waters of Texas and Louisiana. The vessel will be 92 feet long, powered with twin diesel engines, and will cost about $125,000.

Repairs to Bait Boat.—The Harbor Boat Building Company, San Pedro, Calif., is performing repairs to the bait boat Neskleetia which will cost about $15,000. The boat went ashore at Magdalena Bay on September 11, and the repair work consists of a new keel, ten strakes up the port side, a tearing down of the engine, which had lain in salt water, and replacement of considerable electrical equipment.

Repair Fireboat. — The Marine Construction Company, West Waterway, Seattle, was awarded contract recently for repairs to the Seattle fireboat Snoqualmie to cost about $2500.

Dollar Line Calls Reconditioning Bids.—The California and Portland Steamship Company, a subsidiary of the Dollar Steamship Company of San Francisco, has opened bids at San Francisco for repairs and alterations to the two former Transmarine Line steamers Surailco and Sunugentco. These two vessels are from a fleet of 22 which were purchased by the Dollar subsidiary from the Transmarine Line; and are the first of the fleet to be chosen for actual service.

Pilot Boat Alterations.—The San Francisco Bay Pilot Commission, with headquarters at Pier 7, have purchased the power yacht Zodiac on the East Coast and brought her to San Francisco for use as a pilot boat to replace the Gracie S. and Adventuress, which will be used as relief boats. New engines are to be installed in the vessel and she is to be put into suitable shape to accommodate the pilots who are stationed at the entrance to San Francisco Bay.

Diesel-Electric Dredge for Mississippi.—The Sternberg Dredging Company of St. Louis is the latest inland shipowner to apply electric drive to its vessels. A 150-foot, combination hydraulic and clamshell dredge of the tunnel stern propeller type, has just been completed for that company by the Nashville Bridge Company of Nashville, Tennessee, and the new dredge will be self-propelled by diesel-electric drive. Electric equipment for both propulsion and auxiliaries was built by the General Electric Company.

The power plant consists of two Busch-Sulzer diesel engines each driving a 1000-kilowatt, alternating current generator rated 2300 volts, 3 phase, 60 cycles, with direct-connected exciters. The two propellers are driven by 300-horsepower, 600-revolutions per minute motors through belt drive. The main dredging pump is driven by a 1600 - horsepower, 360 - revolutions per minute, 2200-volt, adjustable-speed, wound-rotor motor; the cutter is driven by a 300-horsepower, 900-revolutions per minute motor of the same type and mounted on dredge ladder; and the clamshell is powered by the following motors: one 200-horsepower, series-wound hoist motor, one 100-horsepower shunt-wound swing motor, both direct-current, and a 50-horsepower tagline motor. The swing motor will also be used for swinging the dredge when operating hydraulically. Direct current for the direct-current motors is supplied by a 400-horsepower motor generator set with individual generators for the hoist and swing motions, to give variable-voltage control and special drooping characteristics similar to those of electric shovels on land.

There are also two forward and two aft motor-driven spud hoists, and the usual other auxiliaries and lighting equipment.

The clamshell machinery was furnished by the Marion Steam Shovel Company, and the hydraulic machinery by the Bucyrus-Erie Company.

New Diesel-Electric Yacht.—Felicia, a new diesel-electric propelled yacht, was delivered September 16 from the shipyards of the Bath Iron Works, Bath, Maine, to Senator Jesse H. Metcalf of Providence, R. I. Henry J. Gielow, Inc., were designers of the vessel.

The yacht is 148 feet long, with a beam of 25 ft. and a draft of 9 ft. 6 in. It will carry a crew of 17 men, and have a speed of 17 knots, and a cruising radius of 4000 miles.

The diesel-electric propulsion equipment on this new yacht consists of two 400-horsepower Cooper-Bessmer diesel engines direct-connected to two Westinghouse generators each of 270 kilowatts, 250 volts, direct-current, shunt-wound, 40 degrees Centigrade, 600-revolutions per minute rating which supply power to two Westinghouse 330-horsepower, 250-volt, direct-current, shunt-wound, 300-revolutions per minute propulsion motors. Two 27-kilowatt, 125-volt, direct-current, compound-wound, 600-revolutions per minute Westinghouse generators furnish excitation for the main generators and power for auxiliary purposes. Complete switching and control equipment for the electrical apparatus was furnished also by the Westinghouse Electric and Manufacturing Company.

RECENT CONTRACTS

Nashville Bridge Co., Nashville, Tenn., is building a dredge for stock to be 140 by 36 by 9 ft. dimensions. Keel is scheduled to be laid November 16.

KEEL LAYINGS

Keel of the third combination passenger and freight liner for the Panama Mail Steamship Company was laid at the plant of the Federal Shipbuilding & Drydock Co., Kearny, N. J., September 28.

Keel for the Aircraft Carrier Ranger, (No. 4) for the United States Navy was laid at the Newport News Shipbuilding & Drydock Co., Sept. 26.

Keel for the Arcadia, second of the order for two passenger and freight vessels for the Eastern Steamship Lines of Boston, was laid August 31 by Newport News Shipbuilding & Drydock Co.

Tuscaloosa, Scout Cruiser No. 37 for the Navy Department, was started with the keel laying September 3 at the Camden plant of the New York Shipbuilding Co.

DELIVERIES

Survey vessel for the U. S. Army Engineers office at San Francisco was delivered at Honolulu early in October by the Berg Shipbuilding Co. The vessel is 65 ft. long and made Honolulu from Seattle under her own power.

Two barges were delivered to the Inland Waterways Corp. by the American Bridge Co. during September.

Diesel-powered dredge for Sternberg Dredging Co. was delivered October 7 by the Nashville Bridge Co. This plant also delivered a 100-ft. barge to the same owner.

This plant also launched two deck barges of 100-ft. length on September 5 and 7 for stock. They were delivered to purchasers on September 9.

President Coolidge, second of the de luxe liners for the Dollar Steamship Line of San Francisco, was delivered at New York, October 1 by the Newport News Shipbuilding & Drydock Co.

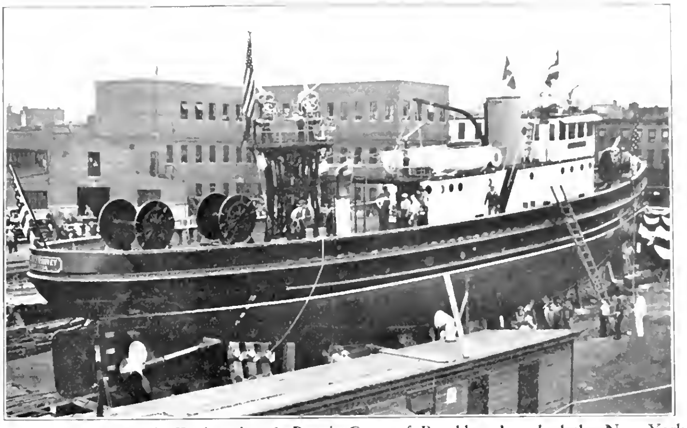
Diesel-electric barge for the Atlantic Refining Co. was delivered by the Sun Shipbuilding & Dry Dock Co., Sept. 9.

One truss-weld dredge was delivered by the United Dry Docks, Inc., Staten Island, N. Y., to Pierce J. McAuliffe on September 16. This yard also delivered a truss-weld barge to Furness-Withy Co. on Oct. 9. A truss-weld float for Jas. Stewart & Co., Inc., was launched and delivered September 14.

Shipyard Issues Annual Report.—The American Ship Building Company of Cleveland, Ohio, recently made public its annual report as of June 30, 1931. In the president's annual letter to the stockholders, their attention is called to the lack of business in the shipyards due to the fact that during the fiscal year 1930-1931 less than fifty percent. of the Great Lakes fleets were in employment as a result of insufficient tonnage being offered in the iron ore, grain, and coal trades. This has resulted in a great lack of repair work to the yard and an almost total lack of new construction.

During the fiscal year the company completed the reconstruction of a large bulk freighter to a self-unloading sand and gravel carrier, equipped with turbo-electric drive. A carfloat, a large lake tug, and a dump scow comprised the new construction. Several fair sized contracts for cargo hold reconstruction were completed, and six engines for use in shallow draft river vessels were completed and delivered.

The president reports that the company is on a sound financial basis and that it is in fine condition to take advantage of new work and repairs when business conditions pick up. He indicates as his opinion that the raising of the level of the water in the Great Lakes, which is expected to be completed by the fall of 1932, will stimulate new ship construction in this area; besides which there are a number of Lakes vessels which will be rebuilt or reconditioned when conditions warrant the expenditure.



The Todd Drydock, Engineering & Repair Corp. of Brooklyn, launched the New York City fireboat, the John J. Harvey, 99 per cent. complete. Her engines and pumping plant started operating immediately on the launching of the vessel into the water.

New York's New Fireboat.—The Tebo Plant of the Todd Shipyards Corporation, Brooklyn, N.Y., launched the fireboat John J. Harvey on October 6. The boat was 99 per cent. complete as she slid down the ways and her pumps were immediately put into operation and she pumped streams of water from her own eight hose mounts and surrounded herself with a sheet of water ejected from a perforated pipe that completely encircles the bulwarks.

The fireboat John J. Harvey, designed by Henry J. Gielow, Inc., of New York, is the largest and most powerful yet built. She is 130 ft. long over-all, 123 ft. between perpendiculars, 26 ft. beam, 7 ft. 6 in. loaded draft. She is of all steel construction with twin screws, and with gasoline-electric power plant. The vessel has been fitted with five 550-horsepower Sterling Viking gasoline engines developing a total of 2750 horsepower for a speed of 18 miles an hour. When in action at a fire, four of the main engines will be switched to supply pumping power for the 8 nozzles to pour 16,000 gallons per minute of water. The fifth engine will operate an electric motor connected with the propellers to offset the force of the pumps and so as to keep the vessel in position. Under way, the main engines operate on two electric motors developing a total of 1165 horsepower.

The vessel has ample accommodations for crew and is equipped with special fire protection devices around storage tanks. The fireproof Plymetl is used for partitions. Carbon dioxide chambers surround the fuel to smother any possible flame The fuel capacity is sufficient to keep the boat in operation 24 hours. Each engine will use 50 gallons of gasoline per hour.

Important Reconditioning. — The ferryboat Chippewa of the Black Ball Ferry Line, operated between Seattle and Bremerton by the Puget Sound Navigation Company of Seattle, is to undergo complete modernization and alteration. The announcement was made by Captain Alex Peabody, president of the company; and contract has been awarded to the Winslow Marine Railroad Co., Seattle, for alterations and to Busch-Sulzer Bros.-Diesel Engine Co. for main and auxiliary engines.

The ferryboat is to have a new diesel engine of 2200 horsepower, single unit, to give a speed of $16\frac{1}{2}$ knots. Other work will include the complete remodeling of all passenger cabins space and a thorough overhaul of both hull and fittings.

George Washington to be Replaced.—The Shipping Board Oct. 6 granted permission to the United States Lines to substitute the former United States Army Transport Somme for the Steamship George Washington in the New York-Hamburg service of the American Merchant Lines, beginning with the sailing scheduled for October 21. The George Washington will be taken out of service and placed in lay-up at the conclusion of her present voyage. The Board also granted permission to change the name of the former army vessel to American Importer. The vessel is of the same type as the American Merchant and other ships in the American Merchant Lines.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of October 1, 1931

Pacific Coast

BERG SHIPBUILDING CO.,
28th Ave., N.W., Seattle, Wn.

Survey vessel for Hawaii for the U. S. Army Engineers Office, San Francisco; 65 x 16; 40 tons displ.; Atlas-Imperial diesel; launched 9/1/31; left yard 9/29/31 for delivery at Honolulu.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Polson Bldg., Seattle, Wn., for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1200 B.H.P. McIntosh & Seymour diesel eng.; 14 knots speed.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; launched 7/27/31; deliver 10/3/31 est.

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; launched 9/14/31; deliver 11/1/31 est.

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

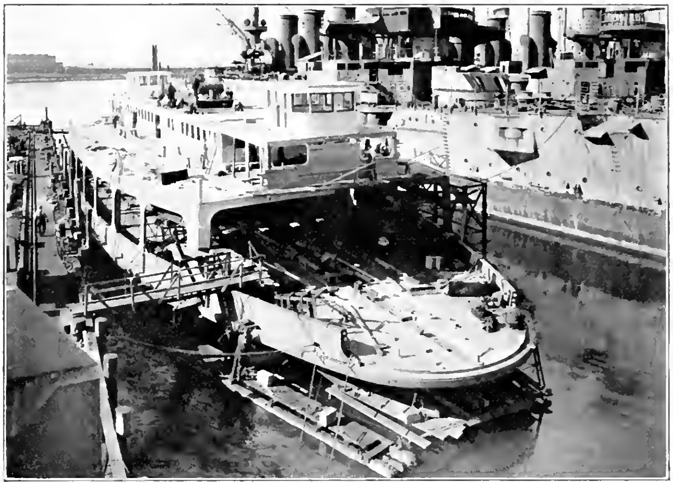
U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP.,
Ltd., Union Plant

Drydock, clean, paint, misc. repairs: m.s. Ethel M. Sterling, stmr. Ruth Kellogg, stmr. W. S. Miller, stmr. Hamlin F. McCormick, m.s. Molokai, m.s. Lio, s.s. President Jackson, m.s. Beulah, ms. Carriso, stmr. Vacuoline, m.s. Piru, stmr. Ventura, launches San Lucas, Asama, tug Restless, Shell Barge No. 9, launch Olympic. Make and furnish 4 piston rings for H. P. cylinder: stmr. Jacob Luckenbach. Repair steering engine: stmr. Scopas. Engine and deck repairs: m.s. Silverhazel. Make 2 bushings to sketch: stmr. Tejon. Install 12 soot blowers: stmr. La Perla. One cast iron propeller: tug F. A. Douty. Parts for turbine: stmr. President Madison. Furnish and install new heads in condenser: stmrs. Saramanca and Suriname. Misc. repairs: m.s. Brunswick, m.s. Capella, tug Pilot, tug Cape Scott, launch Progress, stmr. San Mateo, stmr. Virginia, stmr. Suriname, stmr. Point Gorda, stmr. President Pierce, stmr. La Perla, stmr. President McKinley, stmr. President Garfield.



Above is a progress of construction picture of the ferryboat San Diego at The Moore Dry Dock Company, Oakland, Calif. Below is pictured Samuel E. Mason, general manager for the San Diego & Coronado Ferry Co. and his family. His daughter was sponsor at the launching.

CRAIG SHIPBUILDING CO.,
Long Beach, Calif.

Repairs to the yacht Minonah, to Union Oil Barge, to yacht Mochingome, to fishing barge Mendinoa, to yacht Gloria Dalton.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydock, clean, paint: Democracy (also changed Plimsol marks for new load line, caulked misc. rivets and seam in shell and engine dept. repairs), stmr. Golden Sun (also drew tail shaft, rewooded stern bearing, overhauled sea valves, repaired rudder), stmr. Dorothy Cahill (also made new rudder main piece, remetalled and rebored rudder gudgeons, caulked and renewed misc. rivets, misc. engine dept. repairs), Virginian (also ranged anchor chains, repaired rudder pintles and welded rudder), Lawrel (also overhauled sea valves, repaired piston, caulked rivets and seam), Santa Fe Barge No. 8, stmr. Hawaiian (also removed wheel, drew tail shaft, renewed stern tube, relined line shaft, overhauled rudders, renewed oxter plates, caulked misc. rivets and seam, ranged anchor chains, other misc. repairs), Santa Fe Barge No. 7, stmr. Trinidad (overhauled rudder), American Dredging pile driver (also renewed steel plates on forward end, caulked hull), Elizabeth, Capt. Gregory Barrett, City of San Francisco (also rudder repairs), Benicia (also drew tail shaft rewooded bearing, caulked and welded misc. rivets), Hollywood (also overhauled sea valves, repacked stern gland), ferry Golden Age (also caulked soft spots, removed wheel, turned stern bearing).

PRINCE RUPERT DRY DOCK & SHIPYARD,
Prince Rupert, B.C.

Docked, cleaned, painted: tug Nora Jane (also tailshaft drawn, hull cemented), barge Pioneer (also hull repairs), launch Lillian D (also machine work). Docked: C.G.s. Newington. Docked, cleaned, painted, misc. machine work: 1 fishing boat. Misc. hull and engine work: 22 fishing boats.

U. S. NAVY YARD,
Bremerton, Wn.

Misc. repairs and docking: New York, Lexington, Saratoga, Dorsey, Litchfield. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

AMERICAN BRIDGE COMPANY
Pittsburgh, Penn.

Purchasing Agent: W. G. A. Millar.

Ten barges for Inland Waterways Corp., Washington, D.C.; 300 x 48 x 11 ft.; deliver May 14 to Dec. 10, 1931; 10 keels laid; 9 launched; 9 delivered.

BATH IRON WORKS
Bath, Maine

Trudione, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31; deliver 11/2/31 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 5/1/31; launch 11/9/31; deliver 11/29/31 est.

Hull 148, same as above; keel 5/6/31; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31; deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Hull 153, same as above; keel 9/15/31 est.; deliver 4/28/32 est.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31.

Monterey, hull 1441, sister to above; **launched 10/12/31.**

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launch 10/25/31 est.

Construction progress picture showing the new patrol boat under construction at the San Francisco yard of Anderson & Cristofani for the San Francisco Police Department. The completed vessel will be a fine example of the boat builder's handicraft.

Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 ft., McIntosh & Seymour diesels.

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

DRAVO CONTRACTING COMPANY,
Pittsburg, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **28 delivered.**

Hull 1118, steel oil barge for Atlantic Refining Co., Philadelphia, Pa.; 192x40x 11'9".

Hulls 1119-1128, incl., 10 steel dump scows for American Dredging Co., Philadelphia; **7 delivered.**

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1133, one 15-ton whirler derrick boat for U. S. Eng. Office, Pittsburgh, Pa.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Not named, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/31.

Not named, hull 122, sister to above; keel 8/4/31.

Not named, hull 123, sister to above for Grace Steamship Co., New York; **keel 9/28/31.**

Not named, hull 124, sister to above.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, deliver 12/21/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; **3 delivered.**

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 250, dredge for Sternberg Dredging Co.; 150 x 50 x 7'10" depth; keel 3/21/31; launched 6/3/31; **delivered 10/7/31.**

Hull 255, barge for Sternberg Dredging Co.; 100 x 26 x 6'6"; keel 6/26/31; launched 8/31/31; **delivered 10/7/31.**

Hull 258, deck barge for stock; 100 x 26 x 6'6"; keel 8/10/31; **launched 9/5/31; delivered 9/9/31.**

Hull 259, deck barge for stock; 100 x 26 x 6'6"; keel 8/18/31; **launched 9/7/31; delivered 9/9/31.**

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/31 est. launch 1/11/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City .

President Coolidge, hull 340, passenger and freight liner for Dollar Steamship Co., San Francisco; 653 L.O.A.; 81 beam; 52 depth; turbo-electric drive; 20 knots speed; keel 4/22/30; launched 2/21/31; **delivered 10/1/31.**

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launched 8/15/31; deliver 1/32 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31; delivery 4/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; launch 11/31 est.; deliver 7/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; **keel 9/26/31;** deliver Mar./34 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared [illegible] Babcock & Wilcox boilers; keel [illegible] 31, launch 1/32 est.; deliver 5/32 est.

Arcadia, hull 351, sister to above; keel 8/31/31; launch 2/32 est.; deliver 6/32 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86′ beam; 32′ loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/5/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60′1½″ molded beam; 21′7″ loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; **keel 9/3/31.**

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launch 11/1/31 est.; deliver 4/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/30; deliver 11/1/31 est.

Not named, hull 134, sister to above.
Not named, hull 135, sister to above.
Not named, hull 136, sister to above.

Hull 138, diesel-electric barge for Atlantic Refining Co.; 190x34x12 ft.; keel 2/9/31; **delivered 9/17/31.**

TODD DRY DOCK, ENGINEERING & REPAIR CORP.,
Brooklyn, N.Y.

John J. Harvey, hull 52, fireboat for Fire Dept., City of New York; 123 L.B.P.; 26 beam; 7′6″ loaded draft; 18 mi. speed; 2130 I.H.P. gas-electric engs.; keel 6/23/31; **launched 10/6/31.**

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/31; **launched 10/7/31;** deliver 2/1/32 est.

Knickerbocker, hull 798, ferryboat for New York Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13′9″ loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launched 9/1/31; deliver 11/30/31 est.

Hull 802, float, truss weld, for Jas. Stewart & Co., Inc.; 100 L.O.A. x 31 feet; keel 8/4/31; **launched and delivered 9/14/31.**

Hull 803, truss-weld dredge for Pierce J. McAuliffe; 31x7x3 ft.; keel 8/31/31; **launched and delivered 9/16/31.**

Hull 803, truss-weld barge for Furness-Withy Co.; 73x34x8 ft.; keel 9/21/31; **launched and delivered 10/9/31.**

Trade Literature

The Type H Stirling Boiler is the title of a new bulletin issued by The Babcock & Wilcox Company. It describes a new boiler, which, the company states, has unusual steaming capacity for the low headroom and floor space required. The booklet contains full descriptions and setting plans showing installations of the boiler in widely diversified industries, using many different types of firing. Complete construction details and the many advantages of this boiler are clearly described and illustrated by sketches.

Copies of this publication may be had by addressing The Babcock & Wilcox Company, 85 Liberty Street, New York, N. Y., or the Editorial Department of this magazine.

Diesel Bulletin. — Two recent work-boat types of Cooper-Bessemer diesel engines, with built-in reverse gear of standard design, are shown and explained in a new 8-page bulletin which is being distributed by the builders. Aside from the fact that the Type FP, marine-gear engine is larger than the Type EP, there is no essential difference in design. The application of both types is to fish boats, towboats, and other commercial craft. The engines are fully enclosed, with all accessories built in. Twenty-six general specifications are listed and explained in the bulletin. In addition to photographs, there is a detailed dimension drawing of each engine.

Copies of this "marine gear" bulletin are obtainable, upon request, from the Cooper-Bessemer Corporation at 25 W. 43rd St., New York City; at Mt. Vernon, Ohio, or from the Editorial Department of this magazine.

Modern Steam is the subject of a new bulletin issued by The Babcock & Wilcox Company. It outlines the evolution of marine steam propulsion from low pressure plants to the present economical use of Modern Steam. The bulletin also deals with the economies of steam propulsion from the standpoint of fuel consumption, cost of fuel, lubricating oil costs, flexibility of operation, and other important factors. It is written in nontechnical style and clearly explains the economic fundamentals of ship propulsion. It is profusely illustrated with photographs of modern marine installations.

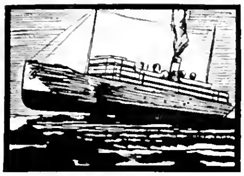
Copies of this publication may be had by addressing the Babcock & Wilcox Company, 85 Liberty St., New York, N. Y., or the Editorial Department of this magazine.

A four-page illustrated leaflet, entitled **Marine Generators and Automatic Cut-Out Panels for Trawlers, Yachts, Tugs, and Workboats,** has recently been announced by the Westinghouse Electric and Manufacturing Company. Copies of this publication (D.M.F. 5385) may be obtained from the nearest district office or direct from the Advertising Department, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., or from the Editorial Department of this magazine.

Nickel — (Literature and Patent References to) is the title of an Index to the general subject of Nickel compiled by J. S. Negru and published by the **International Nickel Company, Inc.,** 67 Wall St., New York. Copies of this booklet may be obtained from the above address or by application to the Editorial Department of this magazine.

Plastic Products.—This is a descriptive booklet, beautifully printed and illustrated, published by the Plastics Department of the **General Electric Company,** Schenectady. It portrays in very interesting style the increasing use of products based on synthetic resins and other binders of various types. It is obtainable either through the company or by application to the Editorial Department of this magazine.

Arc Welding in Industry and **Arc Welders** are two recent booklets published by the General Electric Company which go hand-in-hand. The former is a beautifully illustrated and printed booklet portraying the rapid progress that arc welding has made in its application to the industrial and building trades. The latter booklet is a catalog describing and illustrating G-E Arc Welders in a wide range of capacities. Both these booklets are new and are Nos. GEA-005B and GEA-1440, respectively, and are obtainable either from the various offices of the General Electric Company or on application to the Editorial Department of this magazine.



Marine Insurance

Edited by James A. Quinby

Losses Under Hull Policies

Is a Sea Peril Necessary Where the Policy Contains no Warranty of Seaworthiness?

WITH but few exceptions, modern marine hull policies contain no express or implied warranty of seaworthiness. Many of our hull policies contain a provision for English Law and Usage, which brings into operation Section 39 (5) of the Marine Insurance Act of 1906, reading as follows:

"In a time policy there is no implied warranty that the ship shall be seaworthy at any stage of the adventure, but where, with the privity of the assured, the ship is sent to sea in an unseaworthy state, the insurer is not liable for any loss attributable to unseaworthiness."

Lament

I'm a good insurance broker
  That I know is very true,
But my business comes from relatives—
  A fact you may construe
As a slur upon my efforts,
  But no matter what I do,
I find my other prospects
  All have aunts and uncles who,
As the gods of chance arrange it,
  Are insurance brokers, too.

—J. A. Q.

As practically all hull policies are time policies, and as it is extremely difficult to show the proximate cause of a loss and the privity of an owner thereto, the practical result of this provision is to nullify any requirement that the insured vessel be seaworthy.

While the law as to the warranty of seaworthiness is not clear in the United States, being somewhat obscured by conflicting state statutes and by the tendency of one or two jurisdictions to follow the English rule, it may be said that the weight of American authority requires no absolute warranty of seaworthiness in a time hull policy, but does require that the vessel be seaworthy when the policy attaches, if the vessel is in port at that time. In other words, if the underwriter can show that any given loss is due to a specific element of unseaworthiness which existed at the time the policy was taken out, and that the vessel was in port at such time and her owner might have corrected the defect, then the underwriter may escape liability under his policy. If you think all these things are easy to prove, just try your hand at it some time. To all intents and purposes, then, the hull underwriter must realize that under both English and American law there is practically no chance of avoiding a claim on the ground that the vessel was unseaworthy.

Cause of Loss Must Be Fortuitous.

In any text-book discussion of perils insured against by marine policies, we find the axiomatic statement that a loss, to be recoverable, must be caused by some fortuitous, accidental casualty—something which **may**, not something which **must**, happen. An unexpected result of the operation of wind and wave, as opposed to gradual, natural deterioration. This statement is usually accompanied by its inevitable corrollary to the effect that an underwriter is not liable for the inherent vice or pre-existing defect of the thing insured. In cases of hull policies, then, we are led to the following conclusions:

1. The vessel, in general, does not have to be seaworthy.
2. A loss, to be recoverable, must be caused by a peril insured against.

While these conclusions are not squarely contradictory, they are certainly divergent. Given a case of a vessel suffering structural damage on an ordinary voyage, the underwriter will loudly chant the second statement, while the owner or his canny broker will point with pride to the first. Are the two theories reconcilable?

Inherent Vice Must Be Clearly Proved.

In spite of legalistic bombast to the effect that the assured has the burden of proof in establishing his claim, the attitude of our courts and juries has placed a tremendous handicap upon the underwriter who seeks to escape liability by alleging that a loss is due to inherent vice rather than a peril of the sea. Every effort is made to establish—nay, even to bolster up—a given incident until it assumes the proportions of the necessary sea peril so requisite for the owner's recovery. The same courts lean over backward to deny the existence of a sea peril asserted by a shipowner who is claiming the protection of the Harter Act in escaping liability for cargo damage under his bill of lading. The holdings are not inconsistent. They are colored by the strict interpretation of a statute in the one case, and by a feeling that in the other case an underwriter who drew a policy is seeking to escape from its provisions. In addition to these somewhat justifiable elements of motivation, we are always faced with the great American jury, that noble institution upon whose crest is blazoned the unanswerable query, "What did they get the premium for?"

As a consequence of these purely practical considerations, the lack of a requirement of a warranty of seaworthiness assumes the proportions of an impregnable bulwark of defense to the assured, while the requirement of a peril of the sea, originally a protection to the underwriter, has been so eaten away by gradual attacks and judicial erosion that the idle slapping of waves echoes down through the loud-speaker of legal precedent as the howling of a gale.

For example, in the case of Olympia Canning Co. vs. Union Marine Insurance Co., 10 Fed. (2d) 72, the overloading of a vessel at an intermediate port was held to be a fortuitous act constituting a sea peril, even though the vessel sank in ordinary weather. Underwriters who insured river or harbor craft for sea voyages have been held liable for loss caused by ordinary ocean weather, on the theory that as to such craft, ordinary ocean weather constitutes a sea peril (The Tornado, 1925 A.M.C. 199; Lighter 176, 1928 A.M.C. 554; The Wash Gray, 1928 A.M.C. 923.)

In all these cases, however, there has been some evidence of the operation of an outside natural force upon the fabric of the vessel, in contrast to the silent, gradual decay of the vessel from within. Where there is a semblance of an external force, or where there is no explanation of the loss, the courts are fond of saying that the vessel is presumed to be seaworthy, thus avoiding the real question of the existence of a sea peril. (The Roanoke, 1924 A.M.C. 790; Farmer's Feed Co. vs. Insurance Co. of North America, 166 Fed. 111.)

The Inchmaree Clause.

In addition to facing the ever-present peril of the sea, the modern hull underwriter must contend with the possibility that the shipowner can show that the proximate cause of the loss was a latent defect or the negligence of a master or engineer, which are separate insured perils under the terms of the Inchmaree clause now incorporated in almost every hull policy. If a vessel sinks at her moorings on a calm day, the owner is usually able to show that some negligent act of those in charge of her is really responsible for her loss. Of course, if there is no evidence of prior care and upkeep to rebut the clear showing that the hull gradually rotted away, an entirely different picture is presented. If an aged vessel merely comes to the end of her rope, the implication of inherent vice is strong enough to exonerate the hull insurer, even where the policy agrees to pay damage caused by sinking and the vessel actually sinks. (Wadsworth Lighterage Co. v. Sea Insurance Co., 35 Com. Cas. 1.)

We are faced with the inevitable conclusion that the modern hull underwriter with the Inchmaree Clause in his policy, in nine cases out of ten must pay hull losses, even though such losses can reasonably be traced to unseaworthiness. The only losses which he can successfully resist are those due solely to gradual deterioration.

Chartered Vessel Liable for Fuel

THE United States Circuit Court of Appeals for the Ninth Circuit, sitting at San Francisco, has recently affirmed a judgment handed down in January of this year by the District Court at Los Angeles in the case of the Associated Cil Company vs. the Norwegian steamer Golden Gate, owned by Knut Knutsen. The vessel was operated by the Southern Alberta Lumber and Supply Company under a charter requiring the charterer and not the owner to pay for fuel and supplies. In upholding the right of the seller of fuel to rely upon the credit of the vessel rather than the credit of the charter, in spite of the provision of the charter-party, Judge Curtis D. Wilbur said, in part:

"Appellants rely strongly on the case of United States vs. Carver, 260 U.S. 482, in which the Supreme Court held that no lien arises for supplies furnished a chartered vessel where the charter forbids it, and where the material man, by reasonably diligent investigation, could have ascertained there was a charter and gained knowledge of its terms. In that case there was an express provision in the charter party that the charterers 'will not suffer nor permit to be continued any lien,' and this provision was held to deny the right of the charterer to create a lien. In the instant case the charter party contains a provision requiring the charterer to provide and pay for all fuel oil, but contains no express provision denying the right of the charterer to bind the ship for supplies furnished. It provides 'that the charterers shall provide and pay for all the coals and fuel oil except as otherwise agreed. . . .'

The decision of the Superme Court in The South Coast, 251 U.S. 519, deals with a charter in which the charterer agreed to pay for fuel and supplies furnished the vessel, but did not prohibit the incurring of liens therefor, and held that under such a charter the master could create a lien therefor. This decision is controlling here. . . . .

In view of the fact that in the instant case the charter did not prohibit the charterer from creating liens, it is immaterial as to whether or not the libelant knew or should have known its terms. . . .

Furthermore, the contract of sale between the charterer and the libelant contained the following provision:

'It is agreed between the parties hereto that seller sells said fuel oil on the credit of the several vessels to which deliveries may be made hereunder, as well as on the promise of buyer to pay therefor.'"

The Associated Oil Company was represented in the litigation by Derby, Sharp, Quinby & Tweedt and Daniel Hone of San Francisco, and Ray Howard of Los

Angeles. Counsel for the Golden Gate were Messrs. Young, Lillick, Olson, Graham and Kelly of Los Angeles. It is understood that the vessel owner will attempt to obtain a writ of certiorari to the Supreme Court of the United States.

Tug Owner Denied Limitation

THE case of The Edward, 1931 A.M.C. 1541, illustrates the inclination shown by modern courts to grant limitation of liability only in cases where the owner has been shown to be clearly without fault. Some of the earlier cases allowed the owner to limit liability to the value of the wreck solely upon a showing that he was not personally involved in the unseaworthiness or other cause of damage. That this tendency resulted in an unwarranted delegation of duties by the shipowner and a consequent miscarriage of justice is the opinion of many present-day writers and experts on maritime law.

In The Edward case, the owner had allowed an employe to equip and fit a previously discarded gas towboat for a trip with a tow in the Gulf of Mexico. Although the owner himself did not actually recondition the vessel, he was aware that the work had been done, and on December 19, 1929, while a heavy storm was blowing, he instructed the employe, one Newport, to take the tug out and complete the tow.

The tug went out into the storm and came ashore with all hands frozen to death. In denying limitation of liability upon actions to recover for the death of the crew, the Court held in part as follows:

"As to equipment and crew, petitioner seeks to sustain the burden by proof that he had authorized and directed Newport, who on the fatal trip went as master, to take the tug Edward and put her in first-class condition as to her equipment and provide a suitable crew. That while he had not of course himself installed, supervised, or inspected the equipment put upon the boat or engaged the crew, he had given Newport orders that everything proper should be done, and that if anything was left undone that ought to have been done, or done that ought not to have been done, this was not his fault, but the fault of Newport, the master.

As to leaving port in bitterly freezing weather in the wake of a storm, he declares that if this was an error of judgment, it was the fault of his agent Sweeney and of the master in charge of the boat, and not of himself, since on the day the Edward battled her way out into the Gulf he was not in the port of Galveston.

Claimants urge against these contentions that this case could in no event be one for limitation of damages. That it is indeed a case which in its very nature defeats and rebuts such relief.

I agree entirely with claimants. I think the slightest consideration of the purpose and the language of the Act in the light of the facts which this record discloses makes it plain that petitioner had wholly failed to make proof from which it could be at all fairly found that the conditions which brought about the death of the crew were without his privity or fault."

. . . . .

"In addition to the unseaworthiness in the equipment and furnishings of this vessel, I think it perfectly plain that petitioner is responsible for having the ship put out to sea in the face of the inclement weather ruling on that day. He had arranged for the trip; he had emphasized the urgency of the department which had been delayed because of the repairs making on the barge. He was in Galveston when the storm warnings were put out. He talked to Newport the day before in Galveston about the voyage, knowing he was to leave next day; he had given strict orders for him to leave as soon as the barge was ready, and knowing that he was to leave, talking with him on the day before he left, petitioner left Galveston leaving no orders, as he should have done in view of the condition of the boat, directing Newport to wait until the storm had subsided. Under these facts the case stands as though he were in Galveston on the morning that she sailed, and fully responsible for the sailing.(Texas and Gulf Steamship Co. vs. Clarence Parker, 263 Fed. 864.)"

Marine Study Class Opens Term

The marine insurance study class sponsored by the Association of Marine Underwriters of San Francisco opened its eleventh annual term on October 19, the feature of the initial meeting being an address by Carroll Single, admiralty attorney, on "The Present Trend in the Field of Limitation of Liability." As vessel-owners, shippers, and underwriters in cases like the San Juan and Harvard are vitally interested in the shipowner's statutory right to limit his liability to the value of the vessel after an accident, the subject of the opening meeting drew a large attendance.

The class will continue its meetings during the winter and early spring months. Sessions are held twice monthly on alternate Monday evenings in the assembly room of the Board of Fire Underwriters, Room 906, Merchants Exchange Building, at 6:30 P.M. Attendance is free of charge to members of the marine fraternity desirous of broadening their knowledge of maritime matters.

Freights, Charters, Sales

October 14, 1931.

THE following steamers have been fixed with grain to the Orient: Danish motorship Australien, Portland to Shanghai, $3, L. Dreyfus & Co., Norwegian motorship Samuel Bakke, North Pacific to Shanghai, October, Canadian Transport Co.; Norwegian motorship Danwood, Portland to Shanghai, October, $2.85, W. L. Comyn & Co.

The following steamers have been fixed with lumber to the Orient: British motorship Cape Horn, Columbia River to Japan, October, Canadian American Shipping Co.; British steamer Melmay, Coos Bay and Columbia River to Japan, October, Canadian American Shipping Co.

The Japanese steamer Yoshida Maru No. 1 has been fixed with lumber from British Columbia to Melbourne and Sydney, $10, September, by American Trading Co.

The American steamer Missoula has been fixed with lumber from Eureka and Columbia River to U. S. Atlantic Port, October, by Hammond Lumber Co.

The following sales have been reported: American steamer Robert Johnson, U. S. Marshall to Peter Shafer, $47,000; American steamer C. D. Johnson III, U. S. Marshall to Thos. Thatcher, $32,500.

PAGE BROS., Brokers.

Trade Literature

Kingsbury Bulletin HV. This catalog, just released by the Kingsbury Machine Works, Frankford, Philadelphia, Pa., is the first of a new series and combines in one booklet complete description and analysis of Vertical and Horizontal Thrust Bearings whose parts are to a large extent interchangeable. Only standard self-aligning, equalizing, thrust bearings are covered in this catalog. Capacities, weights and principal dimensions are given for the usual forms of these bearings.

The bulletin describes and illustrates the variety of standard mountings available for enclosing the HV thrust bearings, making it an easy matter for users to apply these bearings to their machines. Most of these mountings include an adjacent journal bearing and automatic lubrication of the unit.

The bulletin may be obtained from the headquarters of the company, from the Western Engineering Company in San Francisco, or from the Editorial Department of this magazine.

Paracoil Evaporator is described in a recent folder released by its builder, the **Davis Engineering Company** of New York. This Paracoil product provides a supply of absolutely pure, distilled water for boiler feed, drinking, culinary, or other purposes as required on shipboard and on land. The product is described and illustrated in detail, with charts and diagrams. It is ready for free distribution on application to the manufacturer of Paracoil products or to the Editorial Department of this magazine.

Burmeister & Wain, engineers and shipbuilders of Copenhagen, Denmark, have just published their annual catalog entitled "The Shipyards—1931." This is a 120-page book, with paper cover, published in English and it is almost entirely made up of full-page photographs of the shipyards and of some typical motor vessels built and engined at the Copenhagen works. Copies may be obtained by application to Burmeister & Wain or to the Editorial Department of this magazine.

General Electric Company has the following loose-leaf catalog sheets ready for distribution:

GEA-708-B—G-E "7600 Series" Synchronous Motors.

GEA-1420—Time Meters.

GEA-1184-A—CR7006-D30B Magnetic switch.

GEA - 1909 - A — Switchgear for Merchant Ships.

Portable Paint Sprayer

AN improved small portable spray-painting outfit, easily operated and carried by one person, has recently been announced by The DeVilbiss Company, manufacturers of spray-painting and spray-finishing equipment.

This low priced outfit, known as the DeVilbiss NC-607, is recommended for use by master painters, decorators, contractors, builders, and others as supplemental equipment for touch up work on small sized painting or refinishing jobs. It is a dependable unit of great adaptability and usefulness, designed for small maintenance painting. This outfit is electrically driven and operates economically on any light socket. The compressor and motor are compactly and securely mounted on a rubber-footed metal base. N.C.-607 will be found very useful and economical for painting and touching up in many locations on shipboard.

Transportation Problems

(Continued from Page 453)

with the growth of business and with changing conditions in our national affairs. It is contended that the existing law might be amended to some degree so as to permit the rail lines more freedom than they now enjoy, but in only one reply has it been suggested that this law be entirely abrogated. The reply from one member is deserving of literal repetition:

'The regulation which prohibits steamers owned by rail lines to operate through the Canal is in the best interest of a majority of the public. Aside from the question as to whether carriers should be allowed to engage in more than one form of transportation, it is a fact that only a very limited number of the rail lines could profitably engage in this service, which would give those so favorably situated a considerable advantage over their less fortunate competitors. Such an advantage could result in upsetting the entire relationship of our national transportation system as now maintained, and the resulting confusion would be detrimental to the best interests of the majority of shippers.'

Railroads Operating Steamships

Our next question asked, **"Do you believe that railroad companies should be permitted to engage in other types of transportation—such as motor truck, bus, air, or steamer—regardless of whether they supplement or compete with their existing rails?"** The majority opinion on this question is clearly to the effect that rail lines should be, to **some degree,** restricted from and permitted to engage in the other forms of transportation. One lengthy statement proceeds on the theory that throughout history those engaged in a business which was changed and supplanted in the course of modern progress and invention have always been free to engage in the activity which supplemented their old business. It is specifically pointed out that the sailing ship owner could go into the steamship business; that the stage coach operator could build a railroad; that the brewery could become a ginger ale or malted milk plant; and that the wagon and carriage factory could become an automobile plant. In accordance with those examples it is held that in every walk of life and in every division of human progress, those who have had their money invested in an industry which was substantially changed or supplanted by invention and development have been free and unhampered, other than by limitations of their own abilities, to engage in the new businesses which came with time and progress. It is held that we must in fairness afford as nearly as possible the same opportunities to the railroads; to the vast billions of dollars invested in them, and to the hundreds of thousands of men who have for many years engaged in their employment. They have given us for years service which has been in every respect essential and important and they should now be free to engage in providing us with the forms of transportation which have removed from the railroad business to some extent the stamp of necessity.

Taxation

In view of the constant agitation in certain circles, urging increases in taxation of some of the agencies of transportation, we asked the following question: **"Do you believe it is sound to equalize the opportunities of transportation agencies by the use of taxation? If so, to what extent should taxation be used in this manner?"** This is one question to which we found a uniform reply and on which the dissenting opinions were few and without reason. Our members are in complete agreement in the theory that taxation must not be used as a lever or weapon to accomplish any purpose in favor of or in opposition to the conduct of business. It is recognized that taxation should be employed only as a means of raising those revenues which our state and federal governments must have in order to conduct the public's business. We quote brief parts of a few of the replies on this question:

'It is not economically sound to attempt to equalize the opportunities of transportation agencies by the use of taxation. Such a method must result in retarding modern ideas applied to transportation; and while I believe in equitable taxation for all instrumentalities of taxation I do not believe that the taxation of one should in any way be based upon the disabilities of others. This may be the proper place to state my opinion that the present rate of taxation as applied to steam railroads is too high. This is particularly true in California and it has been a surprising thing to me that the steam railroads do not more seriously attempt to secure a reduction in their tax rate.'

On the question, **"Should highway carriers pay for the cost and maintenance of the highways through taxes?"**, we find a general sentiment to the effect that those who use the highways, and particularly those who use the highways for the purpose of conducting their business, should pay for the building and upkeep of the highways. There is throughout the answers, however, a strong under-current indicating a belief that those who use the highways already pay a fair share of the expense which they should bear. In line with the foregoing, questions were asked as to **whether steamship lines should pay for the cost of maintaining safe harbors, lighthouses, and so forth and whether air transport lines should pay for the maintenance of air beacons, lighted airways, weather reports, and so forth.** It might have been assumed in advance that those who felt that the highway carriers should pay for the highways would at the same time feel that the other two forms of transportation should pay for the facilities which they use. Such, however, is not the case. We find an almost uniform sentiment indicating that the steamship lines should not pay for the maintenance or building of safe harbors, lighthouses, docks, and so forth and that air transport lines should not pay for the various facilities which they use. Varied arguments were employed to illustrate the views of our members on these subjects, but without exception all pointed to the same conclusion. It was suggested that the facilities required in this connection by steamship operators are universally furnished by governments and are essentially available for the people and ships of all nations; that their creation and maintenance is everywhere regarded as an activity and burden of government and that those using them can not and should not be asked to contribute to their upkeep. It is pointed out in this connection that water transportation is essentially a venture and that risks and perils are connected with it not felt in any other form of transportation. Those risks and perils are always in some manner assumed and borne by the shipper and the public and not by the ship operator except to the degree to which he protects his own interests.

Postal Announces Executive Appointments.—At the regular annual meeting of the board of directors of the Postal Telegraph-Cable Company, Clarence H. Mackay was elected chairman of the board, Major-General George S. Gibbs was elected president of the company, A. H. Griswold executive vice-president, and William J. Deegan vice-president and comptroller.

General Gibbs, the new president of the company, has been identified with the Postal organization since July 1 last, when he retired from the post of chief signal officer of the United States Army and head of the Signal Corps, to become vice-president of the International Telephone and Telegraph Corporation in charge of its telegraph, cable, and radio communications companies.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912 of PACIFIC MARINE REVIEW, published monthly, at San Francisco, Calif., for October 1, 1931, State of California, County of San Francisco—ss.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared Bernard N. DeRochie, who having been duly sworn according to law, deposes and says that he is the Business Manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: Jas. S. Hines, 500 Sansome Street, San Francisco, Calif.
Editor, Alex J. Dickie, 1036 Mariposa Ave., Berkeley, Calif.

Managing Editor: None.
Business Manager: Bernard N. DeRochie, 737 Contra Costa Avenue, Berkeley, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

James S. Hines, owner.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona-fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

(Circulation information is required from daily publications only.)

BERNARD N. DeROCHIE.

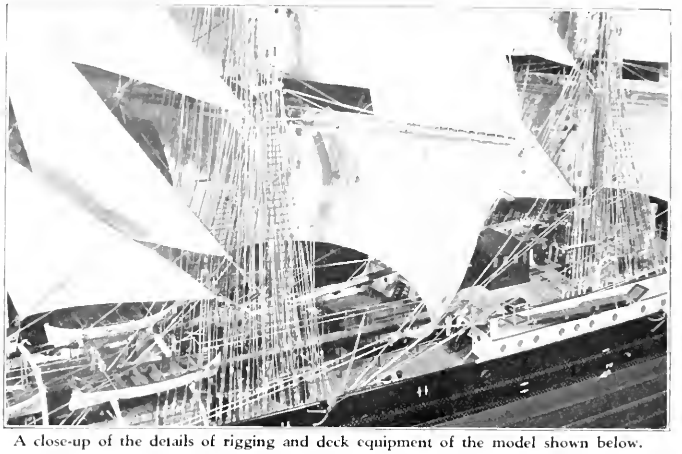
Sworn to and subscribed before me this 18th day of September, 1931.

(Seal) EDITH GOEWEY
Notary Public, in and for the City and County of San Francisco, State of California.
(My commission expires November 22, 1932.)

Marine Transportation Museum

THE Museum of Science and Industry, founded by Julius Rosenwald in Chicago, has recognized the importance of water transportation as an agent of civilization by providing approximately 22,000 square feet of its floor space for depicting the developments of shipbuilding and navigation. This space is being divided into twelve sections, as follows:

1. Primitive craft.
2. Evolution of the sail ship.
3. Evolution of the merchant steamer.
4. Development of lake and ocean freighters.
5. Inland water transportation.
6. Shipbuilding.
7. Development of ship propulsion.
8. Ship interiors and interior equipment.
9. Deck and miscellaneous equipment.
10. Navigation.
11. Marine industries.
12. Pleasure craft, yachts, and other small craft.



A close-up of the details of rigging and deck equipment of the model shown below.

In the presentation of over 225 models which will comprise the various exhibits, modern ideas in museum setting will be carried out to the fullest extent. This will be no storehouse of ship models lacking in elements of interest to the visitor. On the contrary, each model will be placed in a setting which will give it an atmosphere of life and realism akin to the time and type it represents.

Many of the exhibits will be so arranged that they may be operated by the visitor. For instance, a beautiful model of the six-masted schooner William L. Douglas will be mounted on a marine railway which will travel back and forth so that the visitor may see just how vessels are hauled out on such railways for under-water repairs. Likewise, a floating dry-dock will rise and lift its burden of steamship out of the water or lower it to floating position.

Models of various life-saving devices will likewise be operated by the visitor and numerous dioramas will educate him in the differences between the methods of towing on the Mississippi River and the deep-water towing along the Atlantic Coast.

There will be a full-sized replica of a small sailing ship on which the visitor may go aboard and see for himself how the sailor lives surrounded by the various equipment to be found in the forecastle. Likewise, there will be a pilot house in which the visitor may simulate the steering of a ship by turning the steering wheel which will cause reactions similar to those of a ship responding to the helm.

The marine section of the Museum of Science and Industry is under the curatorship of Major Carlos de Zafra, formerly consulting naval architect with the late Charles L. Seabury, who has had considerable experience in maritime displays, and who has secured a leave of absence from the Engineering Department of the New York University to give his entire time to the planning of this section of the Museum.

A beautiful model of the four-masted steel bark Pamir, constructed with all details on a scale of one-quarter inch to the foot, in the shops of the Museum of Science and Industry, Chicago.

Pacific Marine Personals

AFLOAT AND ASHORE — BY PAUL FAULKNER

Five sons in the American merchant marine—and all officers—is the proud boast of Mrs. Marie Gaidsick of Seattle. Photograph at right shows the five brothers on the occasion of a recent reunion at Seattle, their birthplace. They are:

Upper—left to right: Captain Harold G. Gaidsick, first officer of the States Line freighter Texas; Captain Fred C. Gaidsick of the Williams Line freighter Willkeno; Captain Charles T. Gaidsick, first officer of the Admiral Line crack liner H. F. Alexander. Lower—left to right: Captain Joseph A. Gaidsick, of the American-Hawaiian freighter Panaman; and Captain Howard W. Gaidsick, chief officer of the Admiral Line steamship Admiral Evans.

At the 1931 Annual Meeting of members of the SHIPOWNERS' ASSOCIATION OF THE PACIFIC COAST, held at San Francisco, September 24, the following directors were elected:

The purser of a Panama Mail liner is a busy man—with stops at many ports in Central and South America — and passengers and freight for all of them. Above is a picture of the famous smile of Harry Berg, purser on the S.S. Guatemala.

F. J. O'Connor, of the Donovan Lumber Co., R. W. Myers of Hobbs, Wall & Co., James Tyson of The Chas. Nelson Co., S. M. Hauptman of McCormick Steamship Co., L. C. Hammond of Hammond Lumber Co., Otis R. Johnson of National Steamship Co., L. C. Stewart of Sudden & Christenson, S. D. Freeman of S. S. Freeman & Co., H. F. Vincent of E. K. Wood Lumber Co., W. R. Chamberlin of W. R. Chamberlin & Co., John L. Reed of J. R. Hanify & Co., and J. C. McCabe of A. F. Mahony Co.

At the organization meeting of the newly elected directors held immediately after the membership meeting, the present officers of the association were re-elected, namely, F. J. O'Connor, president (this will represent Mr. O'Connor's tenth term); R. W. Myers, vice-president; and Nat Levin, secretary-treasurer.

The entire official personnel of the Panama Mail Line steamship Venezuela, which switched service with the Santa Teresa in the intercoastal service, has been transferred to the latter vessel. The men transferred are: CAPTAIN WALTER PRENGLE, in command; Chief Officer, PATRICK H. GALLAGHER; Chief Engineer, WILLIAM W. BOWERS; Purser, WILLIAM A. McLEAN; Assistant Purser, GEORGE A. CLEGHORN; Surgeon, Dr. FREDERICK M. ROSSITER; Chief Steward, ERNEST SONNEFLETH.

A recent visitor to San Francisco was CAPTAIN D. M. McLAREN, Panama Canal pilot. Captain McLaren reported that the Government of Panama is preparing to make a strong bid to interest American tourists, especially from California. Roads are being built into the jungles where the naturalist, photographer, and sportsman may find a virgin country of unusual beauty and interest; a number of the ancient ruins are being cleared of their underbrush; and sanitary accommodations are being prepared for visitors.

After sixty years at sea, CAPTAIN WILLIAM LYONS, commodore of the American-Hawaiian fleet, has decided to retire from active sea life. Captain Lyons started his sea career as a boy of 13, when he went to sea with a Nova Scotia fishing fleet. In 1883 he sailed in the first four-masted schooner ever built in the United States, and from that time has served under the American flag in sail, steam, and motor vessels. In 1901 Captain Lyons commanded the California, the first steamer built by the American-Hawaiian for the Straits of Magellan trade. When the Panama Canal was opened in 1914, he made the company's first westbound transit with the Missourian. He was in command of this vessel during the war when she was torpedoed and sunk. In 1922 Captain Lyons was given the command of the company's first motorship, also named the Californian, and he remained as master of this vessel until his retirement.

CAPTAIN E. L. SMITH, formerly master of the Minnesotan, succeeds Captain Lyons as captain of the Californian.

The skipper of the rescue ship San Mateo, CAPTAIN E. L. COLBURN, was the recipient of sincere congratulations from veterans of the San Francisco waterfront on the arrival of the vessel from the East Coast last month. This was the first arrival in port of this vessel since her officers and seamen so successfully cooperated with the officers of the steamship Colombia in picking up the passengers of that ill-fated vessel off the Lower California coast in September. The San Mateo is operating in the banana trade for the United Fruit Company and was southbound at the time. The rescued passengers were transferred to the La Perla, another vessel of the United Fruit fleet, which carried the passengers north.

Commodore of the American-Hawaiian fleet, Captain William Lyons has retired from active sea duty. Sixty years is his record, and the motorship Californian his command since 1922.

The silver wedding anniversary of CAPTAIN H. L. JACKSON and his wife was celebrated last month in Seattle. Captain Jackson is master of the Weyerhauser steamer Hegira. The vessel was undergoing repairs at the Todd plant, which enabled the entire officer personnel of the vessel to attend an informal dinner in honor of the occasion. Captain Jackson is the son of Captain Henry Jackson and the grandson of Captain D. R. Jackson, both prominently associated with the pioneer history of Puget Sound.

WALTER B. ALLEN, head of the Los Angeles Board of Harbor Commissioners, was elected president of the American Association of Port Authorities at its recent annual convention held at Philadelphia. This is the second term as president for Mr. Allen within five years. He succeeds Martin Oetterhagan of Chicago. Other Pacific Coast members who are on the executive staff are F. C. MARREN of Seattle, treasurer, and FRANK G. WHITE of San Francisco, who serves on the board of directors.

CAPTAIN J. H. TRASK, who commanded the Oceanic liner Sierra for many years, has been chosen by the Matson Navigation Company to be captain of the new South Pacific liner Mariposa which is nearing completion at the Fore River plant of the Bethlehem Shipbuilding Corp. After a short vacation to his boyhood home in Nova Scotia, Captain Trask will report to duty on the Mariposa to be present during the trial trip and during her maiden voyage to San Francisco and the special round-the-Pacific cruise.

Succeeding Captain Trask on the bridge of the Sierra is CAPTAIN R. J. (Reg) MELANPHY, who has been chief officer of the vessel for the past two years.

It is reported that CAPTAIN W. R. MEYER, former commander of the Ventura, will be the Mariposa's executive officer.

Captain Trask is a picturesque figure among Pacific skippers. A year ago he celebrated his 300th crossing of the equator, having traveled somewhat over 2,000,000 miles between San Francisco and Australia.

PORTLAND SHIPPING CLUB has announced the date for its Annual Steamship Dinner for December 12. The place is the Grand Ballroom of the Multnomah Hotel, Portland, Oregon.

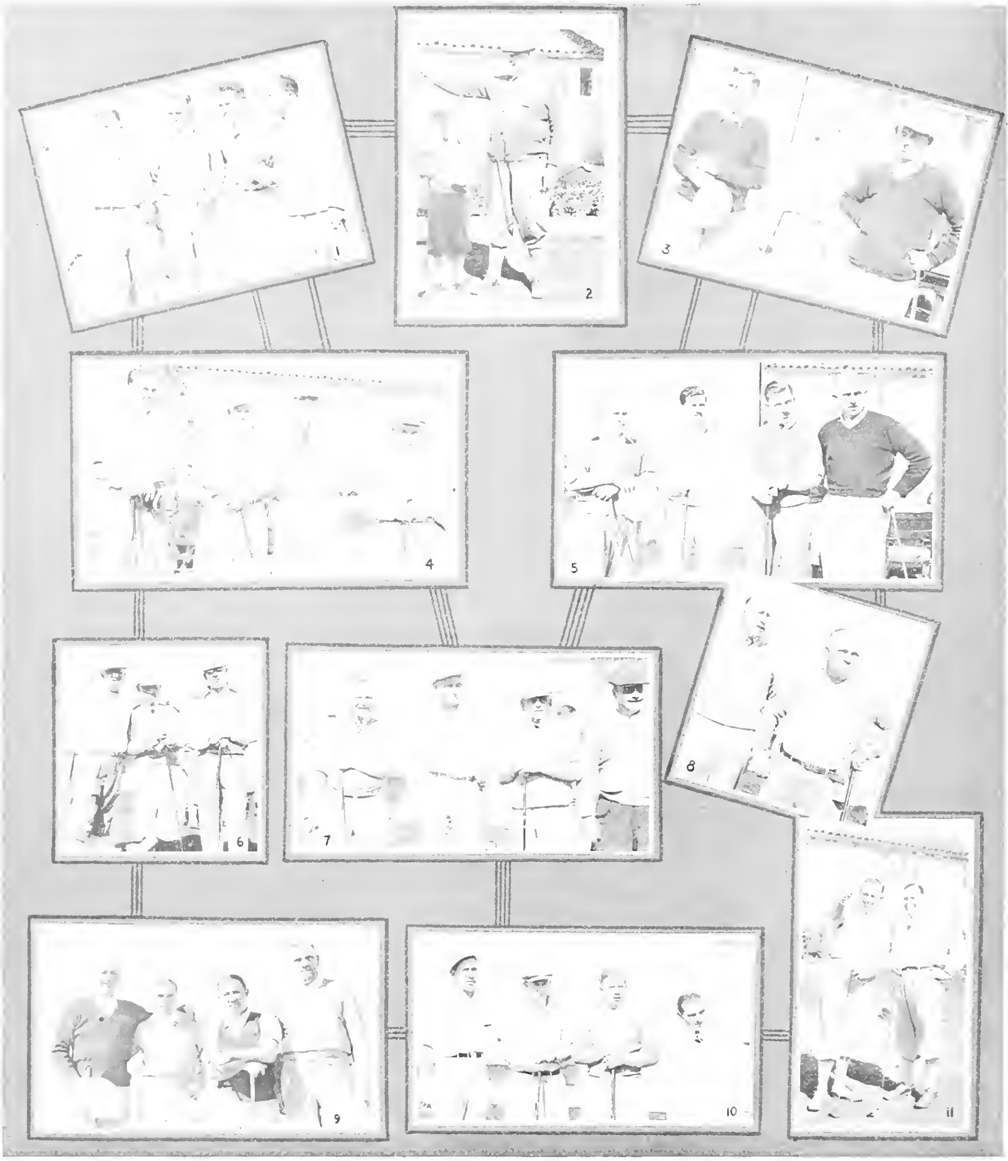
The affair, known among shipping men as the Annual Cruise, has consisted in the past of a banquet, followed by stage, musical, and other forms of entertainment, with room decoration in true marine fashion. Attendance at the annual party is not limited to members of the club and invitations are extended to all shipping men and their friends.

In charge of the dinner and party preparations is STANLEY SEMPLE, chairman of the entertainment committee for the club.

"Good luck," exclaims Commodore J. H. Trask, upon turning over his old command, the Matson South Seas, New Zealand, and Australian liner Sierra, to Captain R. J. Melanphy, October 15. Captain Melanphy has been chief officer of the Sierra for the last two years. He joined the Matson Line in 1917 as a quartermaster on the Lurline. Commodore Trask is now visiting at his old home in Nova Scotia before taking command of the new $8,000,000 Matson liner Mariposa, which will leave New York January 16 and San Francisco February 2, on her maiden voyage, the South Seas and Oriental cruise, to Hawaii, Samoa, Fiji, New Zealand, Australia, and the Orient.

PROPELLER CLUB OF C

UNION LEAGUE COURSE,



1—T. Dave Andrews
J. F. McCone
Will Crockett
Paul Faulkner

2—Jim Rodger, left, tied for championship; and Tom Munro, also a prize winner.

3—Lou Levin
George Kaufman
Harvey Huff

4—L. I. Heller
Frank Fox
Col. C. R. Bennett
F. A. Piercy

5—Louis Siversen
George Schirmer
Niel Judd
Chas. Engle

6—Ed. Egbert
John Greany
Millard Hickman

7—Dr. L. M. Kile
Jack Matthews
D. C. Young
Ralph Sullivan

8—George Swett
Chas. Johnson

9—A. J. Glesener
F. D. Benedetti
Trev. Smith
Capt. Fred Lemon

10—[illegible]
J. O. McDonald
Ray Higgins
O. A. Dunkel

What Happened . . .

Low net for the tournament, also Class B, Class C, and the two guest flights, all ended in two or three entries being tied for low net, indicating A-1 handicapping. Three scores under par and six pars, net score for the course. Winners in ties drew for awards. There were 69 entries.

FORNIA GOLF CLASSIC

ANCISCO, OCTOBER 15, 1931

PHOTOS BY A. D. MILLS

Results . . .

Low Net (Perpetual Pacific Marine Review Cup) (also winner 1930)

L. K. Siverson	[illegible]	Winner
J. B. Rodger	[illegible]	Runner-up

Low Gross

Capt. Fred Lemon	[illegible]	

Flight "A"

Frank DeBenedetti	[illegible] 71	Winner
D. H. Duncanson	[illegible] 72	Runner-up

Flight "B"

F. D. Ritchie	[illegible] 71	Winner
J. F. McCone	[illegible] 71	Runner-up
V. S. Showell	[illegible] 71	

Flight "C"

W. F. Martin	[illegible]	Winner
T. D. Andrews	[illegible] 71	Runner-up

Flight "D"

Harry Haviside	[illegible]	Winner
[illegible]	[illegible]	Runner-up

Guest Flight—Class "A"

[illegible]	[illegible]	Winner
Dr. R. E. Kil[illegible]	[illegible]	Runner-up

Guest Flight—Class "B"

Capt. C. S. McDowell	[illegible] 74	Winner
Ralph Newell	[illegible] 74	Runner-up
Arthur [illegible]	[illegible] 74	

Beginners' Flight

[illegible]	[illegible]	Winner

11—J. F. McCone
T. D. Andrews

12—H. Bennett
Russ Pratt, chairman
Sid Livingstone
Byron Haviside

13—Vernon Showell
C. M. "Dad" Le Count

14—Wallace LeFrenz
Fred Ritchie
Tom Foster
Wm. Humphries

15—H. J. Anderson
D. H. Duncanson
F. C. Jurs
William C. Empey

16—Ralph Myers, president
George Zeh
Phil Coxon
Ralph Newell

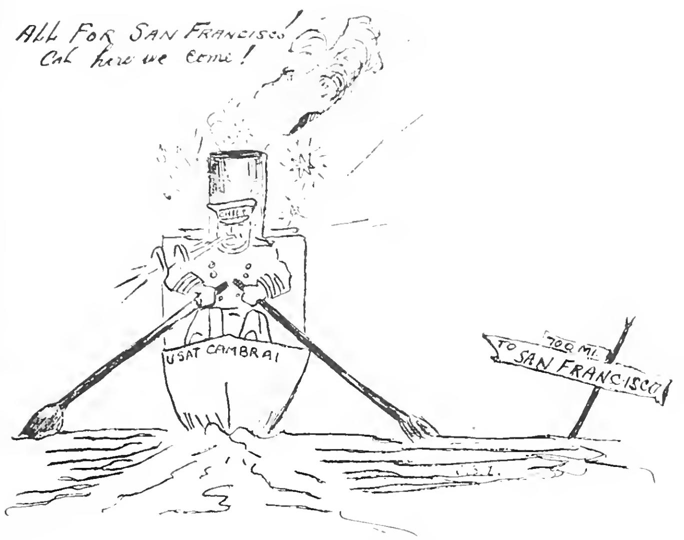
17—L. K. Siverson, 1930 winner tied and won shake-off for 1931 trophy.

18—Joe Jones
Harry Haviside
A. W. Hughes
Jim Cronin

19—Charles Robertson, time-keeper and sergt.-at-arms.

20—Russ Pratt, our chairman. Note "Tete" Haviside alarmed by the screamer!

21—Dave Miller
Gene Essner
Frank "Shoot-5" Depue
Tom Munro



"PULLING FOR THE GOLDEN GATE!"

Here we have a modern style of artwork carried in the newspaper published aboard the U.S.A.T. Cambrai. The subject depicted is one of San Francisco's best friends and boosters—none other than Elwood Williams, chief engineer of the famous transport. Chief Williams' host of friends at San Francisco, every one of them, want Elwood to forever have San Francisco as a homeport base! 'Twouldn't be the same without him!

Mr. Semple is president of the Portland Steamship Operators and president of the Portland Merchants Exchange. Officers of the Portland Shipping Club are SHELBY WIGGINS, president; ARTHUR KINNEY, vice-president, PHIL THURMOND, secretary; and FLOYD ROBERTS, treasurer.

H. E. PIPPIN was recently appointed passenger traffic manager for the MATSON LINE in Australia and New Zealand. For the past three years Pippin has been general eastern agent for the Matson Line with headquarters at New York City. Following his promotion to the Australia and New Zealand territory, with headquarters at Sydney, Pippin's post at New York went to EARL D. WALKER, promoted from the office of general agent at Chicago. J. B. HURD, Pippin's assistant in New York, was put in charge of the Chicago office, replacing Walker.

Though still a young man, Pippin is a veteran in the travel industry. A native of Oregon, he began his career twenty years ago as a messenger for the American Express Company in his home state. He advanced through various posts until 1926, when he left the company to become associated with the Matson Line. His success in developing travel business in the east for his company has been outstanding, and chiefly on the merits of this work he was selected for the important post at Sydney, where he will have the responsibility of developing business for the three new 25,000-ton Matson liners—Mariposa, Monterey, and Lurline.

The first of these new ships, the Mariposa, will sail from New York January 16 on her maiden voyage, arriving at San Francisco January 30. On February 2, the Mariposa will start her first voyage to the Antipodes as part of a special South Seas and Oriental cruise, a 24,000-mile sweep around the Pacific that will terminate at San Francisco, April 28. Soon thereafter the Mariposa will go into regular service between California and Australia.

The Sixth Annual Golf Tournament of the PACIFIC COAST DRY DOCK ASSOCIATION was held on Thursday, September 24, 1931, at the San Francisco Golf and Country Club.

Twenty executives and officials of the member firms of the Association participated in the golf tournament and the dinner which followed at the club house.

The well trapped course of the San Francisco Golf and Country Club proved quite a trial for the dry-docking diveters, and high scores were the feature of the day. The day was a Field Day for the Bethlehem Shipbuilding Corp., as the boys from Bethlehem walked home with all the handsome trophies which were presented for the occasion. The winners and their scores follow:

Low Net:—Arnold Foster (95-18-77) Winner of tournament and handsome silver vase presented by the Pacific Coast Dry Dock Association.

Runner up:—John T. Greany (99-19-80) Winner of silver vase presented by J. J. Tynan.

Low Gross:—T. Scott Clingan (93) Winner of silver comport presented by J. A. Moore.

Low Net, Class "A":—E. F. Essner (102-20-82) Winner of desk fountain pen set presented by George A. Armes.

Low Net Class "B":—Fred C. Kobely (104-24-80) Winner of telechron clock presented by A. S. Gunn.

In May of 1932 Captain I. L. Smith of the U.S. Army Transport service completes 30 years of activity. Our photographer snapped Captain Smith and his grandson, C. S. Smith Jr., at San Francisco aboard the U.S.A.T. tug Slocum. The third member of the group is "Pizzano," mascot of the Slocum.

Pacific Marine Review

DECEMBER, 1931

Official Organ
PACIFIC AMERICAN STEAMSHIP ASSOCIATION

Official Organ
SHIPOWNERS ASSOCIATION OF THE PACIFIC COAST

Pacific Marine Review

The National Magazine of Shipping

VOLUME XXVIII DECEMBER, 1931 NUMBER 12

Contents

Official Organ Pacific American Steamship Association

James S. Hines, President and Publisher.

Bernard N. De Rochie, Vice-Pres. and Manager.

500 Sansome Street, San Francisco

Member of Pacific Traffic Association

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Official Organ Shipowners' Association of the Pacific Coast

Alexander J. Dickie, Editor.

Paul Faulkner, Advertising Manager.

Chas. F. A. Mann, Northwestern Representative, 1110 Puget Sound Bank Bldg., Tacoma, Washington

PHOTO BY CLYDE SUNDERLAND, OAKLAND.

A Busy Day at Oakland Outer Port Terminal

Pacific Marine Review

VOLUME XXVIII | DECEMBER, 1931 | NUMBER 12

The Port of Oakland

Developments Projected on the East Shore of San Francisco Bay Show Great Faith in the Future of Pacific Coast Commerce

OF large area and very peculiar shape, the territory under the jurisdiction of the Board of Port Commissioners of the Port of Oakland, California, extends along the north side of the Oakland Estuary, following the meanderings of that waterway in a narrow and irregular strip which widens out at each end, on the east to embrace the Oakland Municipal Airport and on the west to include the large tidal flats and extended water areas of the Middle, Outer, and North Harbors. This strip is over 13 miles long and varies in width from 1000 feet to $3\frac{1}{2}$ miles. Within this area there are at the present time approximately 10,000 linear feet of berthing space owned and operated by the Port of Oakland and approximately 20,000 linear feet of berthing space operated by transcontinental railroad systems and by private interests.

The object of this article is to discuss the present facilities operated by the Port Commission of the City of Oakland and some of the plans of that commission for the future development of the port.

At present there are nine marine terminals owned and operated by the commission. These fall naturally into four units or groups.

First, the small wharf at the airport at the lower end of San Leandro Bay, whose chief function is to provide a water landing for a speed boat service for airplane passengers and for supplies to the airport.

Second, the group of these terminals on Brooklyn Basin, where the estuary widens out to encircle Government Island, comprising the Ninth Avenue Pier for general cargo and lumber and the two lumber piers Dunnison Street and Livingston Street.

Third, the fine group of three piers, Webster, Grove, and Market Streets, strategically located near the center of the inner harbor. These three piers have a berthing space of approximately 4000 feet and a floor area in the sheds of approximately six acres (254,000 square feet). Piers and sheds are of the most modern construction, and the shore end of the big pier shed on the Grove Street pier houses a fine suite of offices for the executive, operating, and engineering departments of the Port Commission.

Fourth, the great terminal and transit warehouse at the Outer Harbor. This terminal has 2268 feet of berthing space with a possible future extension of approximately 1800 feet. The transit sheds at this terminal have a floor area of approximately five acres. Built of reinforced concrete and of the most modern and approved concrete construction, the warehouse unit at the Outer Harbor has a floor area of 123,660 square feet designed mainly with the idea of assembling cargoes of California cotton.

It will be noted from this brief summary of the commission-operated facilities that large portions of the Oakland waterfront are not as yet touched by Commission improvements and activities. Among these, the most notable is the Middle Harbor, which lies between the Southern Pacific Mole and the Western Pacific Mole. On the north side of this basin there is a large bulkheaded, filled area under lease or franchise to the Southern Pacific Company. Three piers have been built here and are operated by the railroad. Each of these piers has 1650 feet of berthing space. There is room for seven more piers of this size on the waterfront of this filled area. The south side of Middle Harbor is not improved, and that portion which has been reclaimed is under lease to the Western Pacific Railroad Company.

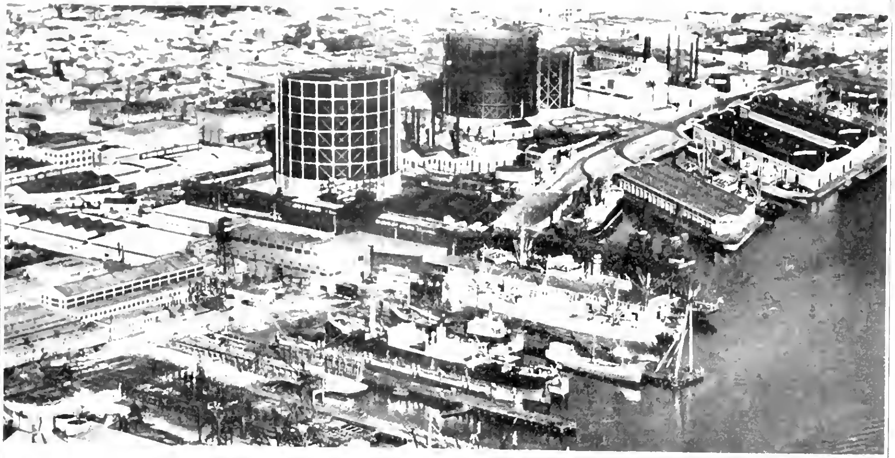
The North Harbor is to be the scene of an immense future development by the Port Commission, which will be described later.

In August 1931, these municipal terminals of the Port of Oakland handled 46,986 tons, against 3744 tons, or approximately 9 per cent. as compared with the tonnage for August 1930. Of interest also are the gains made at the airport, where the figures are as follows:

Transport passengers handled: August 1931, 844; August 1930, 600; this represents a gain of 244 passengers. Transient passengers: August 1931, 482; August 1930, 333; gain, 149 passengers. Sight-seeing passengers, August 1931, 1635; August 1930, 1854; loss, 219 passengers. Students enrolled at Oakland Airport flying schools—August 1931, 387; August 1930, 338; gain, 49 students. Permanent planes in hangars on the last day of the month—August 1931, 68; August 1930, 28; gain, 40 planes.

These gains are typical of recent growth in the business of the Port of Oakland. During the first fifteen days of October, the municipal terminal at the outer harbor alone received by rail, truck, and river steamer 27,334 tons of cargo and shipped out by sea 20,556 tons, over 12,000 tons of this going into foreign trade.

This outer terminal, as will be noted in the illustration, is of quay type, with large transit sheds parallel to the face of the quay and with large level areas of reclaimed tidal flats back of the sheds. As the pictures show, there are three large warehouses and industrial buildings back of the sheds. These are Ware-



(Photos by Clyde Sunderland, Oakland.)

Three views showing present and future developments of the Port of Oakland. Upper: the interior of the Grove Street Terminal; center: airplane view of the central portion of Oakland's Inner Harbor showing the Moore Dry Dock Company and the Grove Street and Market Street Terminals of the Port of Oakland; lower: an airplane view of the Outer and North Harbors of Oakland's port, showing, at the left, the projected development for the North Harbor basin. The roadway at the left of the Key System ferry pier is the projected San Francisco Bay bridge.

house A, leased by Rosenberg Bros.; Warehouse B, leased by Libby, McNeil & Libby; and Warehouse C, operated by the Port Commission. Both of these private firms are very large shippers of canned and dried fruits, and their shipments are going out over this terminal in constantly increasing volume. These warehouses are for transit purposes and for repacking, packaging for export, etc. Warehouse C is solely a transit warehouse to relieve congestion in the transit sheds. At present it is mainly used for California cotton. In that connection there was recently effected between the Fresno Warehouse and Compress Company and the Oakland Port Commission an agreement for the routing of San Joaquin Valley cotton shipments through the Port of Oakland Outer Harbor Terminal. It is estimated that these shipments will presently be 60,000 bales a year, with prospects of considerable increase annually.

The channel of Oakland's outer harbor is now maintained at a width of 800 feet with a depth of 34 feet on mean low water. This enables any vessel regularly calling at San Francisco Bay to make stops at Oakland's Outer Harbor Terminal with safety and without delay. This terminal can now offer to shippers and to ships first class service and excellent dispatch. Twelve intercoastal lines on regular schedules provide 28 sailings a month in Atlantic Coast range and six sailings a month in the Gulf Coast range of the intercoastal trade. In direct European trade there are 14 lines offering a total of 32 sailings a month and covering direct transport in freight and passengers to practically every important European port, including Liverpool, Glasgow, Southampton, London, Hull, Newcastle, Manchester, Cardiff, Belfast, Dublin, and Avonmouth in the United Kingdom; Gothenberg and other Scandinavian ports; Rotterdam in Holland; Antwerp in Belgium; Hamburg and Bremen in Germany; Havre, Dunkirk, Bordeaux, and Marseilles in France; Barcelona in Spain; Genoa, Leghorn, Naples, Venice, and Trieste in Italy.

In the coastwise services, the Outer Harbor Terminal accommodates eleven lines, giving a combined schedule of 36 sailings weekly and covering every port on the Pacific from San Diego to Juneau.

From this brief outline of the activities at the Outer Terminal, it will be readily seen that this terminal is quite busy. Because of this activity and looking forward to large increases in future business, the Board of Port Commissioners of the Port of Oakland have prepared very comprehensive plans for the development of the North Harbor. It was with these plans in mind that the Commission insisted on adequate vertical and horizontal clearances in the channel span of the proposed San Francisco-Oakland bridge, for which preliminary work is now under way. The proposed route for this bridge, east of Yerba Buena Island, divides the Oakland Outer Harbor from the North Harbor. The Oakland Port Commission proposes for the North Harbor development a huge basin flanked by large piers providing an aggregate berthing space for 90 ocean-going freighters. Each pier will have a central three-story transit warehouse flanked on sides and outboard end by one-story transit sheds.

This plan, as in all the terminals built by the Port of Oakland, provides for complete circulation of truck service through the sheds and will be thoroughly fireproof in construction and provided with sprinkler systems to protect the commodities in storage against fire.

In all of its work with shippers and with steamship

(Photo by Sunderland, Oakland)

Webster Street Pier, Oakland Inner Harbor. This pier is especially fitted to service the immense San Francisco Bay and Sacramento River inland waterways commerce.

lines, the Port of Oakland endeavors to cooperate in a spirit of helpfulness to expedite dispatch of shipping. A recent instance of this drew warm praise from a direct European service, The Interocean Line, as follows:

"We would like to take this occasion to thank your organization for the splendid dispatch given the Hardanger during loading at the Outer Harbor on September 24 and 25. In particular, we wish to refer to seven cars of dry fruits which arrived late for loading and which you discharged to the dock commencing at 1 A. M., September 25, completing the work of unloading to the dock, strapping, and examination by the Dried Fruit Association so that we could start loading the vessel at 8:30 A.M. the same morning. This enabled us to dispatch the vessel in proper time, and it is this kind of cooperation which assists in our final results."

The engineering organization of the port of Oakland has been working along sound, conservative lines of design and construction. The plans of all of the transit sheds on piers are laid out with the growth of automobile truck traffic well in mind. Trucks using these piers find that there is no congestion because the complete circulation of that type of traffic through the pier has been adequately provided for by the designing engineer. The fact, together with the large areas directly under the control of the Port and open for industrial development, enables the Port of Oakland to offer prospective shipping a very high grade of industrial location and traffic service at low cost.

With this type of service and this character of engineering, the Port of Oakland will draw to itself for transshipment much of the produce of its rich fertile hinterland and an increasing variety and volume of manufactured items from its local and neighboring industrial plants; and so will become an ever more useful and more rapidly growing factor in Pacific Coast Commerce.

A New Diesel-Electric Automobile Ferry

THE Moore Dry Dock Company of Oakland, California, early in November delivered a new diesel-electric automobile and passenger ferry to the San Diego and Coronado Ferry Company. This vessel is a larger sister of the ferry Coronado delivered by the Moore Dry Dock Company two years ago to the same owners.

The San Diego was built of steel to classifications A-1 and A.M.S. (Ferry Service) of the American Bureau of Shipping. Her principal characteristics are:

Length over-all	204′ 7½″
Length between perpendiculars	190′ 8″
Beam extreme	59′ 11½″
Beam molded	43′ 6″
Depth molded	14′ 11″
Draft light	10′ 2¾″
Displacement, light, tons	756
Registered gross tonnage	556
Fuel oil capacity, tons	23
Automobile capacity	58
Passenger capacity, upper deck	200

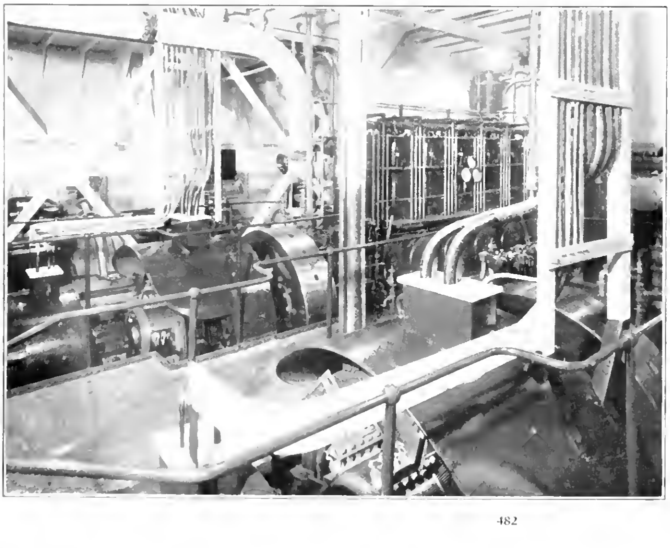
The open panel top sides between main and upper deck and the well proportioned stack give this ferry a pleasing and shipshape profile. The automobile deck is laid in vertical grain Oregon pine decking. The upper deck carries a very nicely fitted up cabin, equipped with comfortable seating accommodations and with modern lavatories. The enclosed portion of this deck is covered with linoleum.

End view of the San Diego showing narrow engine room casing, leaving wide deck available for vehicles.

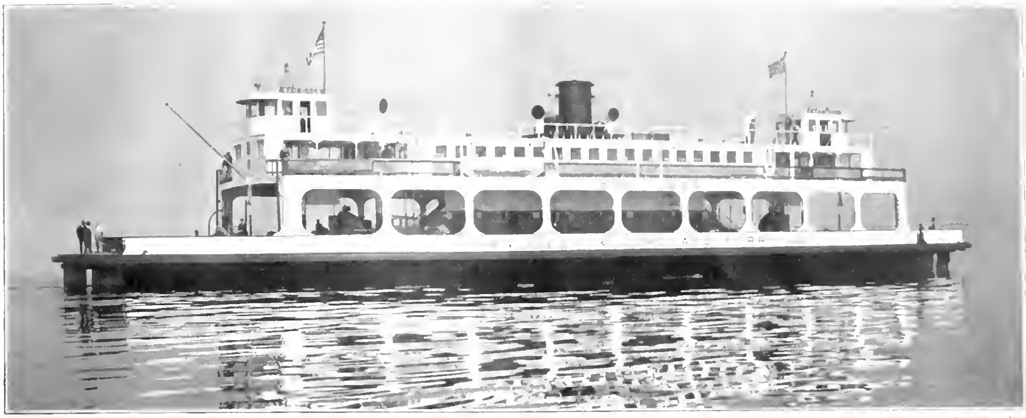
Characteristic of the work of this yard, the hull is a very neat job of ship fitting, fabrication, and assembly. Below the main deck she is divided into five water-tight compartments. The forward and the aft compartments house the steering gear; adjacent to these are the two propulsion motor rooms; and the central compartment houses the generating sets.

Machinery

San Diego's power plant consists of three diesel-electric generating sets. The engines are 6-cylinder, 4-cycle, mechanical injection, 12½-inch stroke by 16-inch bore, Atlas-Imperial diesels, each rated to develop 350-brake horsepower at 275 revolutions a minute. Each of these engines drives a 225-kilowatt, 165-volt,



The engine room of the diesel-electric automobile ferry San Diego showing the port 6-cylinder, Atlas-Imperial 350-brake horsepower diesel directly connected to a Westinghouse 225-kilowatt generator and a Westinghouse 30-kilowatt exciter. Two of these units furnish power for the 750 brake horsepower Westinghouse propulsion motors.



(Photo by Gabriel Moulin, San Francisco)
The diesel-electric auto ferry San Diego presents a graceful picture and throws an artistic reflection.

direct-current, shunt-wound Westinghouse generator and a 30-kilowatt, 125-volt, direct-current Westinghouse exciter.

A propulsion motor is directly connected to the propeller shaft at each end of this ferry. These motors are Westinghouse, 750-shaft horsepower, 500-volt, single armature, shuntwound, and rated at 150 to 180 revolutions per minute. Each drives a 4-bladed solid cast iron propeller, 7 feet 6 inches diameter and 9 feet pitch. The motors are connected through Ward Leonard control system to the generators.

The schedule of this boat calls for a four-minute run over a distance of 2900 feet between slips. Particular attention was therefore given to designing of hull lines and propeller blades, and to motor, generator, and engine characteristics so as to get maximum acceleration and deceleration.

Rix compressors, motor driven, supply starting and maneuvering air. The auxiliary generating set was supplied by the Jenison Machinery Company. Pure lubricating oil is assured by a Sharples motor-driven centrifuge. Warren pumps are used on the circulating general service and sanitary systems. Triblox chain tackles are used in the engine room.

Allan Cunningham of Seattle supplied the double electric steering gear, the electric tell-tale helm angle indicator, the hand steering gear, and the pneumatic whistle. This steering gear has direct electrical control from either pilot house. Each pilot house is equipped with Lietz compass, Cory engine telegraph, Cory running light switchboard, and a small searchlight mounted on the deck above with hand control inside.

The tail shafts are fitted with Sandusky liners, and the outboard tube bearing at each end is the Goodrich cutless rubber. Each propulsion motor is fitted with Kingsbury thrust bearings. Deck capstans are by the Hyde Windlass Company.

The San Diego was built under the supervision of Cordes Brothers of San Francisco. On trial tests on San Francisco Bay she made better than 13 knots speed and performed satisfactorily in maneuvering and in pick-up and reversing tests. Immediately after her trials she was sent down to San Diego under her own power and is now in regular service functioning 100 per cent.

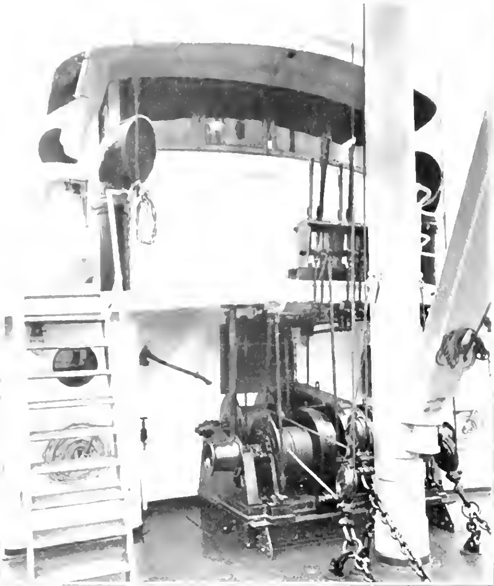
The Diesel-Electric Lighthouse Tender Columbine

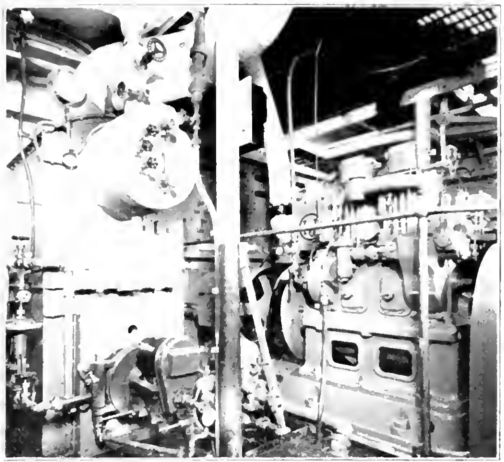
A VERY trim, neat lighthouse tender, the Columbine, was recently delivered to the United States Lighthouse Service at San Francisco by The Moore Dry Dock Company of Oakland. The Columbine is a steel, single-screw, diesel-electric propelled vessel of the following designed characteristics:

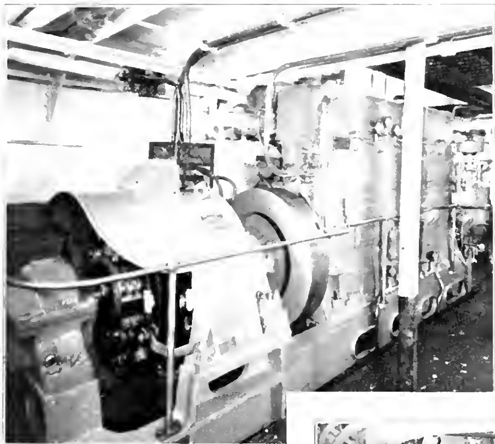
Length over-all	121'4"
Length at water-line	111'8"
Beam molded	25'0"
Depth molded	9'0"
Draft, loaded	6'9"
Displacement, loaded, tons	323
Propulsion motor, horsepower	240
Speed on trials, knots	10.35

The hull space below the main deck is divided into seven compartments by six water-tight bulkheads. From bow to stern these compartments are—the forepeak, containing a trimming tank and the chain locker; a hold; crew's quarters; generator room; motor room; quarters for galley crew; and afterpeak containing stern tube and trimming tank, storage space, and lazarette. The generator room is subdivided by water- and oil-tight bulkheads to form water and fuel-oil tanks.

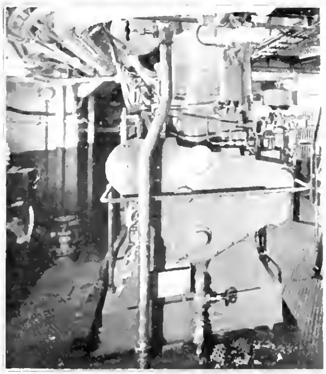
In the steel deckhouse on the main deck are arranged the officers' quarters, officer's and crew's wash rooms, upper portions of generator and motor rooms, galley stores, the galley, and messrooms. These quarters are very nicely fitted out with linoleum floors in

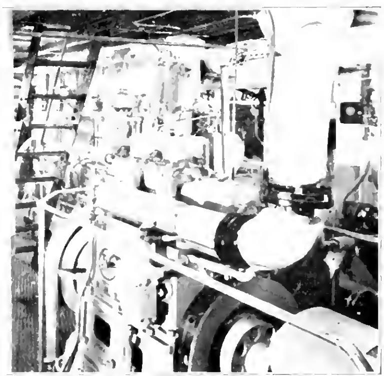






Five views of the machinery on the Columbine. Upper left: The Allan Cunningham winch and control forward of the pilot house on the main deck. Upper right: the Almy water-tube steam boiler with Ray oil burner and the outboard side of the Hill diesel auxiliary generating set. Center left: The Hill-Electro Dynamic auxiliary generating set. Center right: switchboards and control stand on the upper grating of engine room. At right: general view of engine room showing Atlas-General Electric diesel-electric main pr[illegible]lsion unit.





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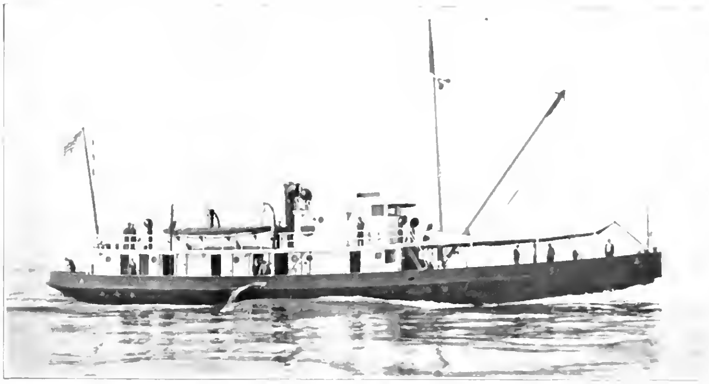


The Columbine on her trials and her sponsor and party at the launching. Harry W. Rhodes, superintendent of the Eighteenth Lighthouse District (at right), his wife, daughter, and grandchild, and Jos. A. Moore, president, The Moore Dry Dock Co.

staterooms and mess room, vitreous white tile in the wash rooms, and a grooved tile in the galley. As will be noted from the illustrations, the galley is very commodious for a vessel of this size. It is fitted with the famous Ingle oil-burning range, built in San Diego, and with a large Frigidaire cabinet, with the refrigerating machinery below in the motor room. Plumbing fixtures are by Sands of Philadelphia. All quarters are steam-heated, steam being supplied by an Almy water-tube boiler from Providence, Rhode Island, equipped with a Ray rotary oil burner built in San Francisco.

The main propulsion plant of the Columbine consists of two 100-kilowatt, 250-volt, diesel-electric generating sets and a double armature 240-horsepower 500-volt electric motor with a rated speed of 350 revolutions per minute.

These main engines are 6-cylinder, 200-horsepower, 4-cycle, solid injection Atlas-Imperial diesels, built in Oakland, California. The generators and the motor are General-Electric, built in Schenectady, N. Y. General-Electric supplied also the controls, the switchboards, and the majority of the auxiliary motors.

The generator room is protected against fire by a 6-cylinder Lux installation, with main deck control, supplied by Walter Kidde & Company, New York. Auxiliary power and current for lights is provided by a Hill diesel from Lansing, Michigan, driving an Electro-Dynamic generator from Bayonne, New Jersey. In order that current from the main propulsion circuits may be used for certain auxiliaries while under way, a Westinghouse rotary converter from Pittsburgh, Pennsylvania, is part of the equipment.

The galley of the Columbine featuring the Ingle range and Frigidaire cabinet.

Allan Cunningham of Seattle, Washington, supplied the electric windlass, the large electric winch, and the hand-steering gear. Henschel engine room telegraphs from Amesbury, Massachusetts, —Fairbanks-Morse fire and bilge pumps from Chicago.—Yale chain blocks from Stamford, Connecticut,—Pyrene fire extinguishers from Newark, New Jersey,—Fry Marvel pumps from Rochester, New York.—Square D controllers from Milwaukee, Wisconsin,—and Lyons metal lockers from Aurora, Illinois,—all testify to the spread of a shipbuilding contract. Ample starting air is insured by a motor-driven Rix air compressor built in San Francisco.

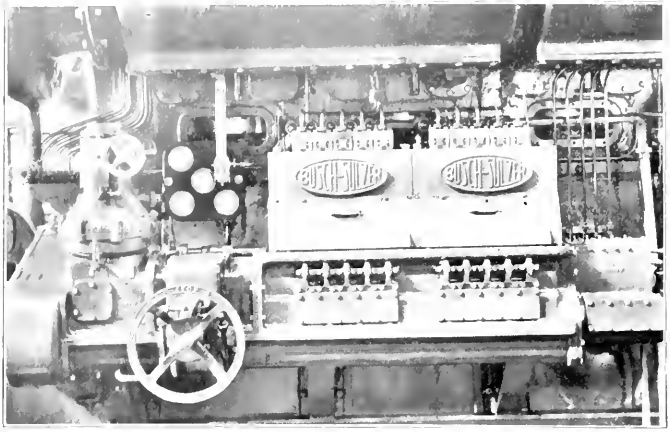
This widely spaced geographic spread of equipment sources is very apparent throughout the vessel and illustrates how universal are the benefits of even a small shipbuilding contract.

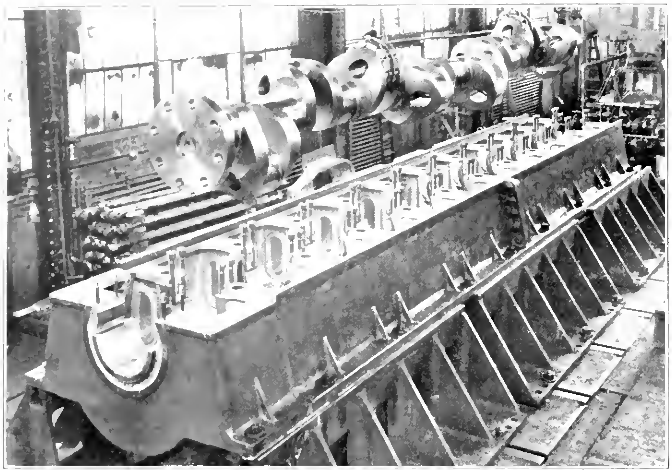
The generator and motor rooms are well ventilated and arrangement of machinery allows easy access to all mechanisms for lubrication, cleaning, and overhaul. An unusual feature of the generator room arrangement is the location of the switchboards and the banks of resistors above the upper grating. This saves room below and gets the resistors into a well ventilated location where there is no danger of overheating and where examination, adjustment, and repairs or replacements are easily effected.

Boston and Lockport blocks fitted with Metalline bushings are standard equipment on the lifting gear for handling buoys and other lighthouse service equipment.

The Columbine is certainly a big little ship, well built and well found. Her construction was supervised by Superintending Inspector M. F. Fernald. She is now actively in operation with Captain W. K. Bodie in the Pilot House and Chief Engineer H. Wylie in the generator room, and is proving herself a very useful addition to the floating equipment of District No. 18 under the capable management of Harry W. Rhodes, District Superintendent at San Francisco.

New Type Busch-Sulzer Trunk-Piston Diesel Engine

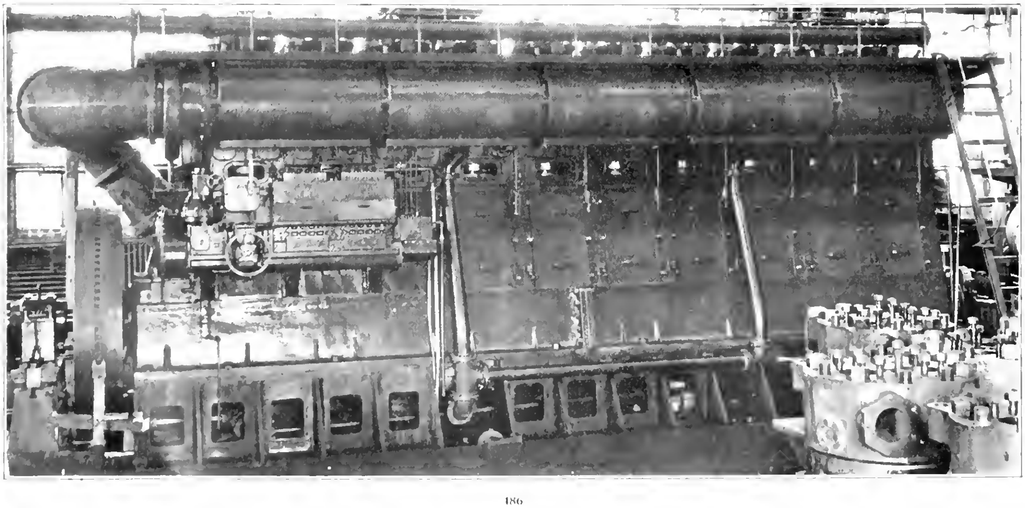




Above: a close-up of the control gear and fuel pump.

At left: the ten throw crank shaft being lowered into its bearings in the bed plate.

Below: the 10-cylinder, 3000-horsepower, mechanical injection, 2-cycle, trunk-piston Busch-Sulzer diesel assembled for test at the St. Louis shop.



New Type American Diesel Chosen for Conversion Program

IN the April 1931 issue of Pacific Marine Review appeared an article wherein was described a 10-cylinder, 3000-brake horsepower unit of the new type 2-cycle mechanical injection Busch-Sulzer diesel engine building for the village of Freeport, New York. The illustrations herewith show this engine on the test stand at St. Louis, and we are glad to announce that a marine engine of this type is now building for installation in the Puget Sound ferry Chippewa. This engine, which will drive a direct-connected screw propeller, will have eight cylinders ($19\frac{1}{2}$x27 inches), and will deliver 2200 brake horsepower at 210 revolutions a minute.

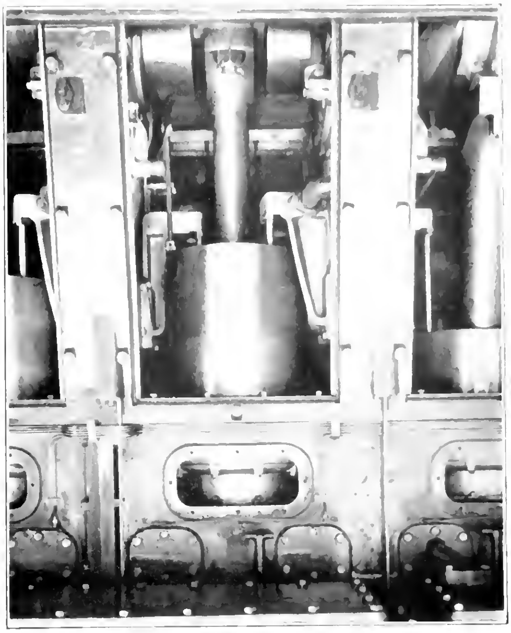
This new type engine is of remarkably compact, simple, and efficient design, enabling large power to be installed in small space with comparatively low headroom.

Several novel features are incorporated, a number of which have been patented by Busch-Sulzer or are the subjects of pending patent applications.

The bedplate and cylinder block are each in two lengths. The intermediate frames are of modified "A" frame design. Tie rods from the top of the cylinder block to the underside of the bearing bridges in the bedplate bind the structure into a rigid unit. The arrangement of the doors or covers of the frame make a light and convenient assembly. The doors are of steel plate, made tight at their tops and sides by return angles resting against soft packing strips in grooves cast into the frame. The bottom edges of the doors rest against the interior sides of upwardly projecting flanges along the top of the bedplate; which flanges are machined on their interior faces and serve also to locate the intermediate frames and hold them rigidly in the transverse direction.

Busch-Sulzer automatic blade valves control the upper tier of scavenging ports. These ports are shaped and spaced along the lines developed by A.E.G.

The cylindrical surface of the piston-skirt is not punctured by holes for the wristpin; and the entire skirt is a plain symmetrical body without heavy bosses such as are required for the usual method of mounting the wristpin in the piston. The wrist-pin, of case-hardened steel, is attached to the connecting-rod and takes its bearing in an internal housing over the whole length of the upper half of the pin, the unit bearing pressure being about one-half of that usually obtained with the conventional construction. The wear of this bearing, which is pressure-lubricated, is substantially nil. The absence of holes through the wall of the skirt also



PISTON VISIBILITY—Close-up of the new Busch-Sulzer diesel with crank case cover removed, showing accessibility of piston and rod. Note the inspection holes in the so-called sludge chamber through which the piston surface is open to observation at all times.

avoids leakage of lubricating oil to the outside of the skirt, which leakage occurs in the ordinary construction, no matter how tightly the wristpin is fitted in the bosses.

Between the bottom end of the cylinder liner proper and the interior of the crank-case is a so-called "sludge chamber," through which the piston passes. This chamber is provided with wiper rings above and below, and is open to the atmosphere. The upper wiper ring strips off the lubricating oil that is carried down by the piston, and the lower wiper ring strips off that which is carried up from the crankcase. There is no possibility of gases or flame from the cylinder entering the crankcase, or lubricating oil from the crankcase passing up into the cylinder, and the piston is visible from the outside, so that its condition and lubrication may be observed at all times.

The fuel injection system and combustion chambers are of the A. E. G.-Hesselman type. There is a separate fuel pump for each cylinder, all pumps being combined in a common housing, with a single drive. The fuel lead is constant for all loads; the quantity is regulated by the governor control of the point of opening of the spill valve. The arrangement of the fuel pump and control mechanism is such that the starting, stopping, reversing, and fuel-control adjustments are performed by means of a single-handwheel.

The performance of this new type of engine in the Chippewa will be watched with great interest by the American merchant marine operators and engineers, and it bids fair to be the forerunner of a long line of installations for speeding up America's cargo vessels.

The Fibreboard Case Afloat

A Series of Articles Describing a Recent Pacific Coast Development in Shipper Service

Part I.—Simplifying Stowage Problems

MODERN transportation systems on land and sea have developed the spirit and the technique of "shipper service" to a very high degree. The idea now uppermost in the mind of the intelligent transportation operator is no longer formulated in the question "What is the cheapest method by which I can move this shipment from Terminal A to Terminal B?" but rather "How can I best handle this shipment from terminal to terminal so that the consignee will have the greatest satisfaction and will remain a friendly customer to the shipper and a booster for my transportation system?"

Actuated by the motives involved in this formulation of his problem, the operator becomes an advisor to his shippers as to many problems involved, among which by no means the least is the factor of proper packing of the commodities shipped.

This article is the first of a series to be pulished in Pacific Marine Review for the purpose of calling the attention of shipowners and ship operators to a recent

The first shipment of Pacific Coast raisins in fibreboard cases entering the warehouse at Fishmongers Hall Wharf, London.

Pacific Coast canned goods in fibreboard cases going aboard ship.

Pacific Coast development which already has been of great assistance in solving this problem for certain commodities and which offers great promise of aiding its solution for many general cargo shipments. This development is the Export Fibreboard Case Association, formed to service fibreboard case shipments and to carry on research work and practical experiment for producing the best fibreboard case for any given purpose.

For over two years canned food products of the Pacific Coast and raisins in cartons and in bulk have been going out to the markets of the world in ever increasing volume, packed in the approved export case of the Export Fibreboard Case Association. This export case is followed almost everywhere by the service of the Association which is now practically world wide. This Association is composed of leading manufacturers of fibreboard cases, and member manufacturers of cases are licensed to use the Association's trade mark on shipping cases which meet the standards of merit set up through export experience in actual world-wide commerce. Headquarters are at San Francisco. Including in its membership mills and factories on the Pacific Coast, in Hawaii, on the Atlantic Coast, on the Gulf Coast, in England, and in Australia, and with service representatives in many of the principal ports, the Association is educating shippers and shipowners the world around in the advantage of using fibreboard cases.

In the mechanical handling of fibreboard cases, the modern platform sling, with proper spreaders, is almost a necessity; and the Export Fibreboard Case Association's world-wide service is introducing that Pacific Coast labor-saving and damage-minimizing equipment into many ports where its advantages have hitherto been unknown. This service alone will prove of tremendous economic value to the world's ship operators.

From the viewpoint of the ship operator, possibly the most important phase of the use of the fibreboard case in export shipping lies in the fact that the advantages to the shipper and consignee are obtained along with a positive increase in ship operation economy.

This economy is derived from two main factors; first, the reduction of space and weight requirements for stowage; second, the minimizing of damage claims. These two factors, together with the more thorough and more careful stevedoring and stowage technique developed in connection with the use of fibreboard cases, are enabling the ship operator to offer superior service at less operating cost. The increased use of the Association's approved export fibreboard case is fully justifying the service maintained by the Association.

The standard export case now in use is approved for export shipments of canned goods and for raisins, either in bulk or cartons. For these commodities it has been demonstrated that, in comparison with wooden boxes, strapped for export, the fibreboard case makes possible a saving of 7 to 8 per cent. in the gross weight of the package and a saving of approximately 15 per cent. in the space occupied by the package. With any considerable volume of tonnage moving, it is obvious that these savings mean considerable in added freight revenues for the ship.

In order to take full advantage of these favorable stowage factors, it is necessary to provide a level, even base for the stowage of the fibreboard case. The stowage is then built up from the bottom with the cases in each tier staggered as in the building of a brick wall. No intermediate flooring is necessary. The tiers can be built to the full height of the ship's hold if the foundation is right. The export fibreboard case, being machine made and die cut, is a uniform and standard dimension package and fits into stowage of this nature much more readily and accurately than any other type of case. It therefore requires less dunnage and when proper and level resting is provided no leveling strips are required between tiers.

Shipowners and ship operators will appreciate the advantage of a package which simplifies stowage problems and at the same time saves valuable space and deadweight.

In the January, 1932, issue of Pacific Marine Review, we shall continue this discussion, showing how the Export Fibreboard Case helps to deliver commodities in good condition and so minimizes damage claims.

The Tuna Cruiser City of San Francisco

G. BAVIAQUA & SON, of the Genoa Boat Works, Fishermen's Wharf, San Francisco, have recently completed the hull construction of the billet-headed tuna cruiser City of San Francisco, claimed to be the largest tuna cruiser ever built in San Francisco. The work of installing machinery and equipment is now practically complete, and as this vessel presents several unique features, the following description should be of interest.

The City of San Francisco was built for Nick Colla and Tom Cresci. She is 92 feet long by 25 feet beam, very sturdily framed and planked in Oregon pine. On the main deck aft are two large removable live bait tanks measuring 16 by 22 feet and having a 12-ton capacity. Under the raised deck forward, the space on the main deck is divided as follows: Sleeping quarters for six men, equipped with individual lockers, writing desk, and other conveniences; storage chambers; lavatories; and a spacious galley equipped with Ingle oil burning range, and with a large refrigerator cabinet. The deckhouse on the raised deck provides a fine roomy pilot house, a chart room, a radio room, and officers' quarters with bunks for six. A protected lookout stand is arranged on the top of this deckhouse.

The City of San Francisco at the outfitting dock.

Machinery Installation

The main propulsion plant consists of one 300-brake horsepower, 6-cylinder, 4-cycle, directly reversible, mechanical injection, Western-Enterprise diesel engine, direct-connected to a 64-inch diameter, 54-inch pitch Western-Enterprise propeller. For auxiliary power and electric light there are installed two 32-kilowatt Westinghouse generators, one driven by belt off the main propulsion engine, one directly connected to a 53-horsepower 2-cylinder Western-Enterprise diesel engine.

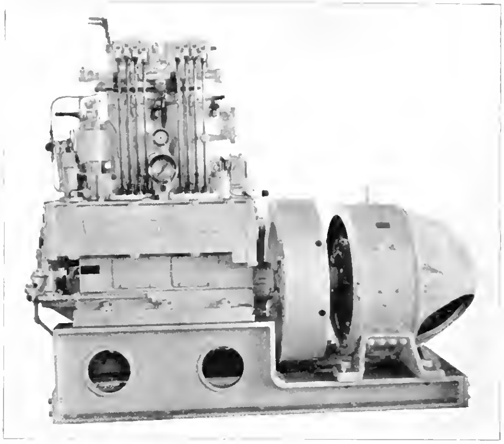
Two 6-inch Fairbanks-Morse centrifugal pumps, each direct-connected to a 15-horsepower Westinghouse motor are installed to take care of the circulation of salt water in the bait tanks. Each of these units is capable of supplying the two tanks.

A 6-ton capacity Cyclops refrigeration unit takes care of the ship's stores, the bait tanks, and the fish hold. Practically the entire inner surface of the hold is lined with refrigerant coils. Over 2500 feet of $1\frac{1}{4}$-inch pipe was used for this purpose and, with the exception of valves, all joints in this piping are welded, resulting in a particularly neat installation. These coils are covered with removable gratings, protecting the fish, providing cold air circulation, and facilitating rapid cleaning. An additional 700 feet of welded pipe coils are installed in the bait boxes to insure proper temperatures in tropic waters. The compressor taking care of this system is belt-driven by a 10-horsepower Westinghouse motor.

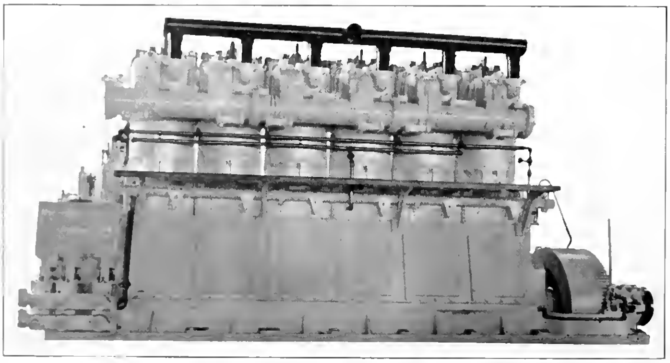
As a safety valve on this electric system and to take care of radio and emergency light and power, the City of San Francisco carries an Exide "Ironclad" battery of 56 cells, giving 110-volt current. This battery, together with the switchboard, the carbon dioxide fire extinguishing equipment, and the wiring was installed by Ets-Hokin & Galvan.

There are three welded steel fuel tanks in the engine room, with a total capacity of 8000 gallons; and two 625-gallon fresh water tanks are built into the stern. All piping is welded and galvanized after welding. Mechanical remote control of the main engine is arranged from the pilot house and from the lookout station on top of the pilothouse. Sounding tubes, consisting of a deck plug with a 2-inch brass tube extending almost to the floors, are installed in the main fish holds.

This boat was built at the back of the Genoa Boat Works plant so as to leave the marine ways free for repair jobs; and when she was ready to launch, the big Haviside Derrick Barge No. 4 was warped into position and her big hook, with its falls of American Steel & Wire Company rope, picked up the City of San Francisco and swung her over and gently dropped her into the waters of fishermen's lagoon.



Auxiliary unit on the City of San Francisco, a 53-horsepower Western-Enterprise diesel direct-connected to a 32-kilowatt Westinghouse generator.



At left: The main propulsion unit of the City of San Francisco, a 6-cylinder, 4-cycle, mechanical injection, direct-reversible Western-Enterprise, 300-brake horsepower diesel engine. Below: A carload of diesel and electric machinery for the City of San Francisco leaving the Western-Enterprise shops in Los Angeles.

Artist's conception of the new United States liner Manhattan, as she will appear when finished.

Largest American-Built Liner

Steamship Manhattan of the United States Lines Ready for Launching at the Camden Yards of the New York Shipbuilding Company

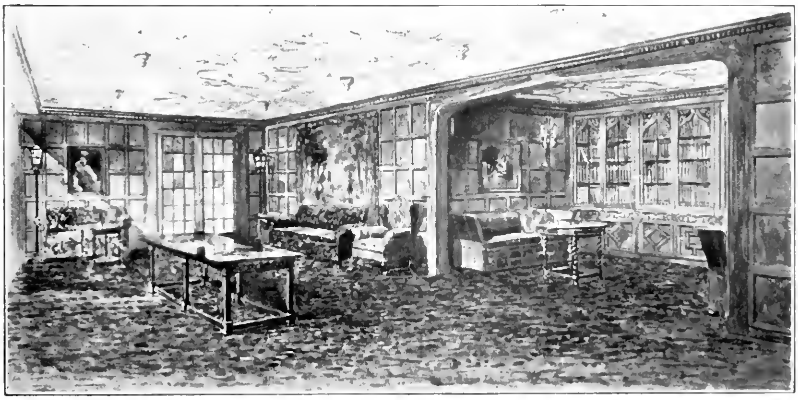
NAMED Steamship Manhattan, and ready to be christened and launched, the first of the United States Lines' 30,000-ton liners for the North Atlantic service will take her maiden dip into the waters of the Delaware River from the New York Shipbuilding Company's yard at Camden on Saturday, December 5. She will be christened with a special blend of liquid composed of water from each of the forty-eight states of the Union. In each state the Governor selected some river, lake, or spring well known for its historical significance and sent some of the water from this source to the office of the United States Lines. These waters were all mixed and the christening bottle filled from this mixture.

The Steamship Manhattan is not only the largest merchant vessel launched to date from an American shipyard, but she is the first transatlantic liner built in America for thirty-three years.

Her principal characteristics are:

Length over-all	705 feet
Length on water line	685 feet
Length between perpendiculars	666 feet
Beam molded	86 feet
Depth to promenade deck	79 feet
Light load draft	32 feet
Gross register tonnage	30,000
Deadweight capacity, tons	12,000
Shaft horsepower, normal	30,000
Shaft horsepower, maximum	34,500
Normal cruising speed, knots	20
Guaranteed fuel consumption (oil per shaft horsepower hour), pounds	0.65

Steamship Manhattan has a raked stem and cruiser stern. She will have eleven water-tight bulkheads, making twelve water-tight compartments. The mach-



The interiors of the public rooms of the Steamship Manhattan will follow period styles. Here we have the delightful library in English Tudor.

The dining saloon of the Steamship Manhattan will be decorated and furnished in a very pleasing adaptation of Louis XVI period.

inery spaces are arranged with an auxiliary engine room between the two boiler rooms. This engine room has double skin to a point well above the water line. Each engine room and each fireroom is a self-contained unit. With the exception of the machinery spaces, there is no door in any water-tight bulkhead below the deep load water line. There is inner-bottom construction for the entire length of the hull.

The vessel is designed to have a positive metacentric height of 6 inches under light load conditions, and of 4.4 feet under full load condition.

Steel water-tight hatch covers will be installed. Lifeboat capacity for all passengers and crew will be carried on the latest Welin-McLachlan gravity type davits.

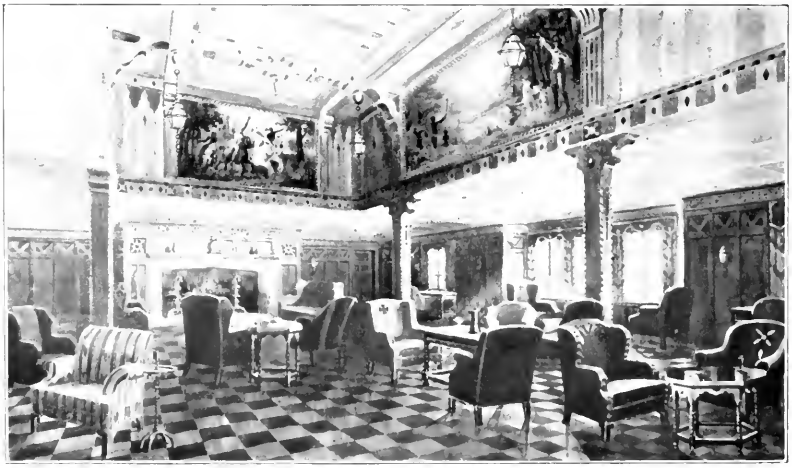
Passenger Accommodations

Thirteen hundred passengers in three classes will be accommodated on the Steamship Manhattan. The first class public rooms will reflect period architecture, decoration, and furnishings. They include a grand lounge in the Georgian style, a smoking room in early American Indian and Aztec, a Palm Court in Chinese Chippendale, a Pompeian verandah cafe, a library in Tudor, a modernized Sherarton writing room, cabin foyers in Italian Renaissance, and a Louis XVI dining salon. Decorations and design of these rooms were created by the Walter M. Ballard Company of New York and Washington. A lavish use of rare hardwood paneling is being made a feature of the first class staterooms under the workmanship of Henry Klein & Company, cabinet makers of New York.

Machinery

The Manhattan is a twin screw job and will be powered with two triple-expansion, Parsons-type, single-reduction gear steam turbines capable of producing 34,500 shaft horsepower at full nozzle opening and 30,000 shaft horsepower at 85 per cent. nozzle opening. The guaranteed speed at the latter power is 20 knots, and the guaranteed fuel consumption under these conditions is 0.65 pound of fuel oil per shaft horsepower hour. Steam will be generated in large three-drum water-tube boilers at 400 pounds per square inch throttle pressure.

With the addition of the Manhattan in the summer of 1932 and of her sister vessel in the fall of the same year, the new United States Lines, under the joint ownership and operation of the Dollar-Chapman-Dawson, Roosevelt-I.M.M. groups, will have twelve transatlantic liners operating as follows: Leviathan, President Harding, President Roosevelt, Manhattan, her sister ship (not yet named), American Banker, American Merchant, American Trader, American Shipper, American Farmer, American Exporter, and American Importer. These twelve ships total approximately 200,000 gross tons.



The first class smoking room of the Steamship Manhattan is in somewhat mixed motif, with American Indian and Aztec pictures and colors predominating.

Illuminating Art as Applied to Merchant Vessels

By Samuel G. Hibben*

THE art of illumination on ship or ashore often finds itself overlooked and disregarded; men are slow in admitting and realizing its tremendous possibilities. Perhaps the possibilities are known to some, but the ready means to achieve the desired ends seem hard to seize upon,—the tools limited, or complicated. Yet simple materials are at hand and ready! From floodlighting its lofty funnels to distributing light evenly in the very bowels of its throbbing engine rooms, this art of illumination can perform wonders on any ship.

In the present day and generation, two general principles are slowly but surely making themselves felt. First, decorations and lighting should be given thorough consideration along with the structural plans of the vessel and carried beyond the bare utilitarian needs. Second, lighting and decorations should have a character and a distinction all their own. No designer, owner, or architect should plan a passenger vessel to look like a rooming house. Hotels are fine things in their place, but people do not want floating hotels. The average man who boards a ship has seen his share of hotels; he wants to see something new, something different from the dull, the conservative, the prosaic. If on the ocean, perhaps for the first time, he wants something refreshing, stimulating, original, like the wind on the sea at night.

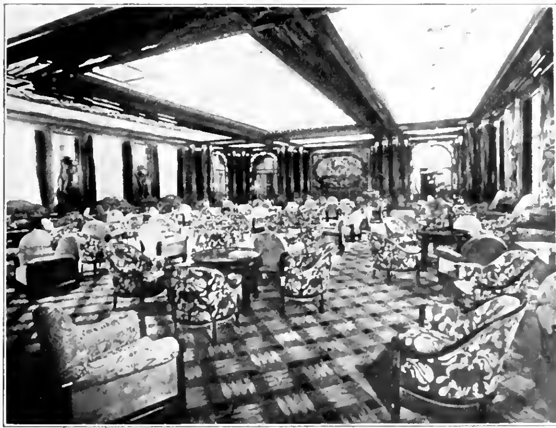
*Manager, Commercial Engineering Dept., Westinghouse Lamp Company.

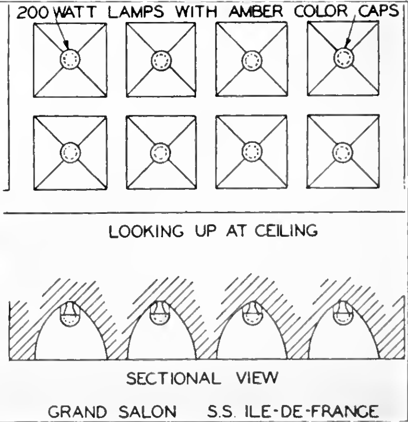
Flood-lighted funnels on Italian steamship Conte Grand—artistic, identifying, a good advertisement, and producing sufficient illumination for the top deck.

Blending with the Interior Decorations

One of the most important reasons why lighting should be planned before the interior trim is placed is because then, and only then, is it possible to have the lighting blend with, and tie in with, the design and spirit of the room. If this is not done the room will be planned, perhaps even constructed, before any thought is given to the illumination.

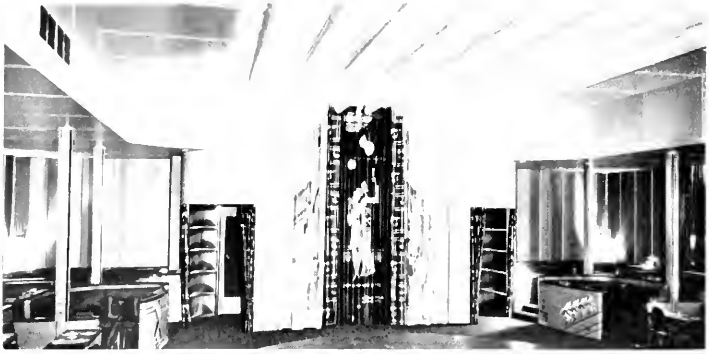
But the old order changeth! In one of the smaller smoking rooms of the Ile de France, the designs on the ceiling are in graceful curves. The lighting engin-





Ceiling lighting in the grand salon of the French liner Ile de France is produced from ceiling coves located in three large panels, those in the central panel being arranged as shown in the plan and section.

Interesting Examples of Ship Lighting



Above, an interesting application of long trough lighting units, which, combined with color changes, produce artistic lighting effects in the Night Club of the Steamship Leviathan.

At left, the first class foyer of the motorship Kungsholm is illuminated by an interesting use of cove lighting from a large, single source.

A beautiful effect is produced by the luminous ceiling over the swimming pool of the motorship Kungsholm. At left, a large illuminated sign identifies the Bremen.

eer, daring to tie in with these designs, constructed luminous panels following these same graceful curves. In a de luxe suite, the central oval panel gave the effect of sunlight, changed to moonlight by the touch of the switch button. These are merely random examples of the many ways a ship's individuality may be expressed.

Consider the typical stateroom on a boat. It is the condensed version of four or five rooms; namely, milady's boudoir, the gentleman's dressing room, a bedroom, reading room, and sometimes a "hospital." All this should be given careful thought and consideration and the lighting adornment should be planned along with the structural details of the vessel. Hardly sufficient, it seems, to provide the minimum requirement of one 25-watt lamp, or even the wattage minimums of the A.I.E.E., which are as follows:

	Watts per Cubic Foot		
	Direct	Semi-direct	Indirect
Lavatories and baths	0.100	0.187	0.25
Staterooms, cabins, public rooms	0.1	0.15	0.2
Passenger entrances	0.1	0.15	0.2
Passages	0.075	0.125	0.15
Outside passages	0.8	...	...
Crew's quarters	0.1	...	...
Officers' quarters	0.1	0.15	0.2
Engine rooms and entrances thereto	0.1	...	...
Boiler rooms, entrances thereto, gratings and fiddley hatches	0.08	...	...
Steering gear room and windlass enclosure	0.075	...	...
Cargo spaces if permanently lighted	0.05	...	...
Cargo spaces lighted by portables	0.1	...	...

Low Ceilings a Problem

Lighting from the low ceilings of practically all rooms aboard ship constitutes one of the major problems to be solved. Add to this the low ceiling beams, metal work and conduit, and Grover Cleveland's statement that "It is a condition and not a theory that confronts us," holds true. It has been solved in one way by encasing the lights on either side of the beam. If the lights are spaced close together (25 watt lamps some 6 to 8 inches apart) behind the proper diffusing glass, the result is a glowing, luminous beam pattern. Another way is to imbed lights in the under side of the ceiling surface itself, as in shallow boxes. This will, of course, be some 30 per cent. less efficient than open reflectors, but it provides an interesting and novel effect. If the space is deep enough, a remarkably uniform illumination results. The essentials are good glass, proper ratio between spacing and depth, and a diffusely reflected background, preferrably curved.

Sometimes the complaint is made that "modern" lighting and its novel and interesting effects is all very well and good, but that it is too costly, it is impractical, and it is perhaps all right for the large super-liners but is out of question entirely for anything else. This is a valid and serious objection, and anyone who ignores it will probably come to grief.

Lighting equipment need not be ugly to be efficient! The ideal is scientific and decorative lighting at reasonable cost. Like a successful drama or story, good illumination depends on a good idea. The good idea is seldom costly. It is the fumbled and bungling idea that is costly. It means poor distribution of light, glaring units, insufficient intensity, and fixtures that are inharmonious in design and too expensive to maintain over a period of years.

Wall Lighting Luminaires

The wall type of lighting is a valuable aid for low ceilings. It has been severe; it can be made very elaborate. Large luminous wall panels etched or molded with artistic designs take the place of pictures. These designs can be very charming and beautiful and at the same time fulfill the very practical purpose of giving glareless light. Luminous wall panels can be large or small, depending a great deal upon the size of the rooms, the spacings of the windows or posts, and the supporting ribs. Various devices can be developed for wall lighting purposes. On the Bremen, a huge thermometer-like unit, the upper part of which is entirely luminous, constitutes an example of one trend to wall lighting. Fixtures of translucent glass being quite near the ceiling and wide laterally, but distributing the light evenly, form a pleasing effect, particularly in the long, low hallways or portions of salons. The most satisfactory moderate wall treatment in staterooms is the use of translucent porcelain, such as the Lenox china sconces and pockets, that direct most of the light upward but transmit a mild creamy light.

The separately attached luminous panel—perhaps a better name is applique lighting—can be used anywhere. It can be long and thin, fat and round, or square and small. It can be of artistic design by an eminent artist or merely "homespun" and simple. Standard shapes and sizes are available, all self-contained.

One luminous box equipped with the proper reflecing background and efficient glass is sufficient for a small bedroom. A rough rule is to use two watts per square foot of floor area, or roughly equivalent to 0.25 watt per cubic feet. A number of boxes, each equipped with a high wattage lamp and spaced symmetrically on the upper side walls and ceiling, give a splendid light for a large social hall or dining room. Some of the more artistic lighting installations disclose the fact that the basic idea behind much of the "modern" is the ceiling box or wall panel in some shape or form.

Period Lighting Adds Variety

Harry B. Etter in a paper "The Interior Decoration of the Passenger Liner" has this to say:

"America is far too cosmopolitan in its make-up to have a large transatlantic liner decorated throughout in the modern, simply because some previous ships built for foreign flag lines, are of modern design. So the fact remains that a liner for the American flag service could well adopt a number of styles, the symbol of the many nations, without having a grand mix-up, especially where the spaces are isolated enough.

To have a strong American feeling made up as America is of most of the great nations of the world, it would seem interesting, say, to have an important room in Colonial, another in French, one in Italian, a Spanish room, English room, Dutch room, etc., all pure to some good period of decoration of the several nations whose sons have done so much toward forming the United States of America."

If this suggestion is followed, which within reason has and is taking place, more features of the illuminating engineer's "white" art will be brought to the fore. He can make a lamp bulb look like a candle flame, or a rod, or a tinted sphere from the size of a pea to the size of a basketball, and he can design a fixture to follow any period. If he cannot find a "fixture" to copy that will be historically correct, he can light your period room from concealed sources, for soft sunshine or moonlight is a proper background for all styles.

Period lighting produces a charming atmosphere. The same fixtures that helped to light the smiles of the fair ladies in the courts of old Europe may be diligently copied and these sconces and lanterns that once

(Please turn to Page 518)

The Conte di Savoia on the stocks ready for launching at Trieste, Italy.

First Gyro-Stabilized Passenger Liner

The New 48,000-Ton Lloyd Sabaudo Liner Conte di Savoia, Italy's Largest Passenger Liner, to Have Three Sperry Gyro-Stabilizer Units

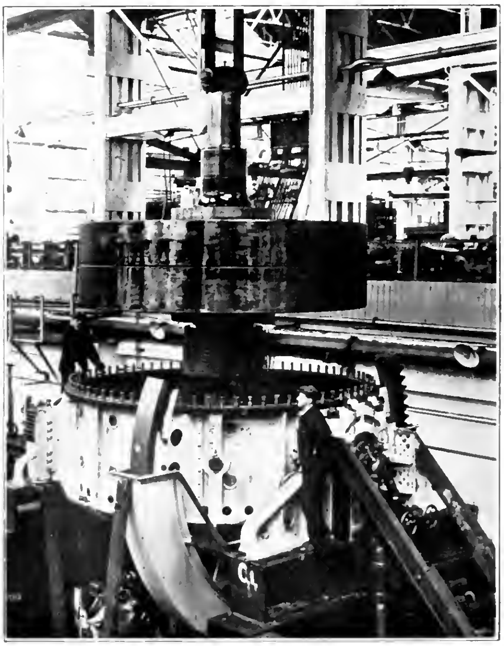
WHEN the new 48,000-ton Lloyd Sabaudo liner, Conte di Savoia, slipped off her stocks at Trieste on October 28, the Italian shipbuilding industry took a progressive step that challenged the interest of the entire maritime world. Boasting several other innovations, the Conte di Savoia is the first passenger ship in the world to be equipped with a gyro-stabilizer plant for the elimination of rolling.

When she enters the New York-Mediterranean service in 1932 she will be equipped with a three-unit Sperry Gyroscope Stabilizer system of sufficient power to counteract the effects of the roughest seas. This plant is standard Sperry equipment which, up to the present, has been used exclusively in private yachts and warships. It is three times larger than any at present in use.

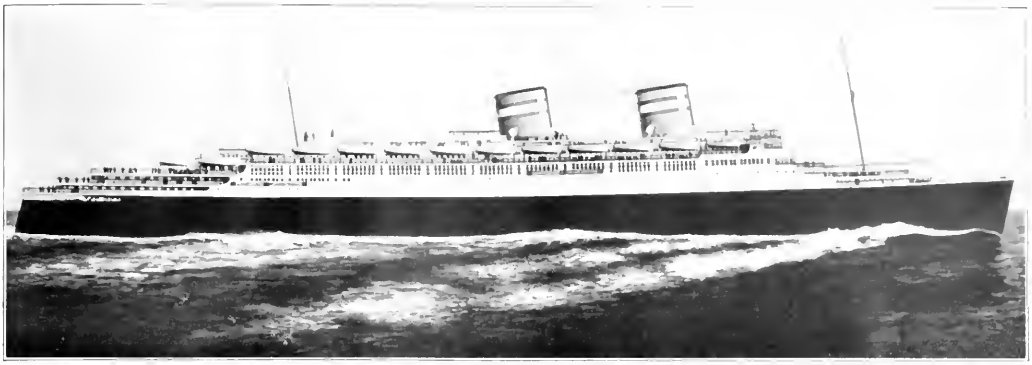
The equipment consists of three separate gyroscopes, each with a rotor 13 feet in diameter and weighing 100 tons or 300 tons in all. The gyroscopes are electrically operated; each has its own automatic control device; and the units can be used separately or in tandem, according to weather conditions.

Stream-line construction of hull and superstructure to reduce wind and sea resistance and the arrangement of the funnels to provide maximum sun deck space for sports are two other features which will make the Conte di Savoia distinctive in appearance, in passenger appeal, and in economy of propulsion.

In addition to the usual tank tests of the first models of the new liner's hull and superstructure, the science of aero-dynamics was introduced when the models were tested in wind-tunnels used for testing of aeroplane models. Her unusual lines, the 120,000-horsepower geared turbines, and quadruple screws promise to make the Conte di Savoia one of the fastest



One of the 13-foot diameter, 100-ton Sperry gyro-stabilizers for the Steamship Conte di Savoia.



An artist's conception of the appearance of the Steamship Conte di Savoia when finished, showing the unique position of funnels, permitting the largest free open sports deck space on any ship afloat.

ships afloat. Her guaranteed speed is more than 27 knots.

The rakish yacht-like appearance of this vessel will be accentuated by the unusual location of her two funnels. These are set well forward so that the base of the forward stack is just aft of the bridge. The result of this arrangement is a smooth stretch of open deck space aft of the second funnel, providing the largest sun-deck on any ship. This deck will provide space for an unusual number of sports and will house a large outdoor swimming pool which in the winter months will be enclosed with a sun-glass roof.

The Conte di Savoia will have eleven decks, an overall length of 811 feet 9 inches, and a beam of 95 feet 10 inches; and she will accommodate 1900 passengers. When launched she was 4000 tons heavier than the Rex, recently launched, and is the heaviest ship ever launched in Italy. The elapsed time of 12 months 25 days between the laying of her keel and the launching constituted a new record in big-ship construction, beating by more than a month the record formerly held by the Bremen.

Other features of the new ship are a thirty-car garage, electrical mechanism throughout, eighteen watertight compartments, double bottom and air-tight cells, safety, radio-equipped lifeboats. Lloyd Sabaudo, in the construction of this super-ship, has given the shipping industry a new mark at which to aim, and has given its competitors a challenge with the world's first Sperry-stabilized passenger ship.

Switzerland's Access to the Sea

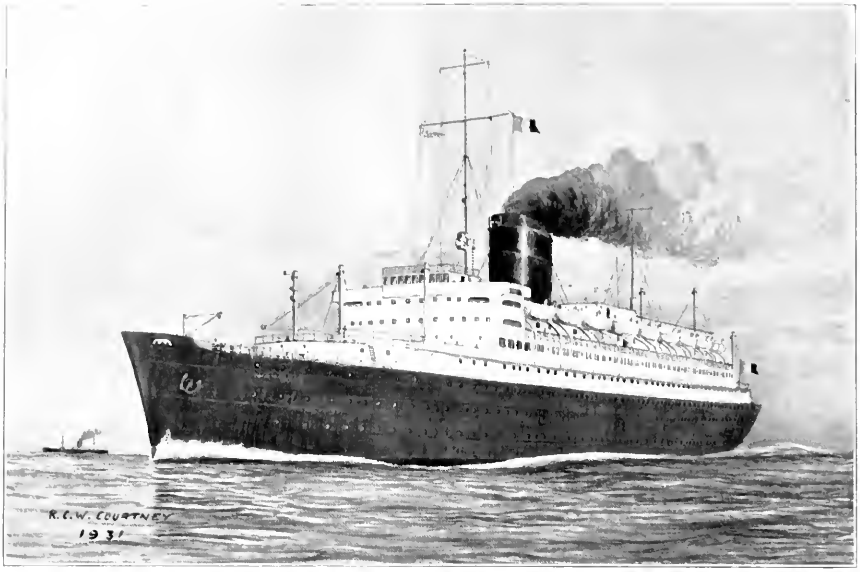
The Port of Basle at the Head of Navigation on the Rhine Shows Remarkable Development

ALTHOUGH 1930 was not very favorable to navigation on the Rhine in general, the traffic of the majority of ports having diminished, the terminus ports of Strasburg and Basle, on the contrary, reported a considerable increase of activity. For example, the traffic of the port of Basle shows a 78 per cent. increase as compared with the preceding year.

At any rate 1930 will go down as an important date in the history of Swiss Rhine navigation. For it was in 1930 that the international convention for the regulation of the Rhine was enforced and the same year witnessed the beginning of the important transformations provided for by the above-mentioned agreement. It also was in 1930 that the port of Basle registered a new record, having attained approximately 1,100,000 tons, against 618,000 in 1929.

Owing to the favorable meteorological conditions, the Rhine was open to traffic from the end of April until the middle of December. The traffic was so intense that the installation of port and railway terminals, although of recent construction, were often barely sufficient to meet the demand. During July, in which 182,000 tons were transshipped, there was an average of 151 tons per meter of wharf. This constitutes a coefficient of utilization which leaves far behind those of all other Rhine ports. In order to cope with the affluence of merchandise, several private companies built additional new gasoline and bitumen tanks on the Klybeck wharf. The construction of the second dock of Klein-Huningen is to be undertaken very shortly. The tonnage of the fleet registered today for the port of Basle amounts to 87,000 gross.

The importance of river navigation to Basle has been duly recognized by all Swiss economic circles. The fact is stressed that it is thus possible to bring into Switzerland, under particularly favorable conditions, the many raw materials necessary to cover the country's industrial needs. In well informed circles, it is believed that, owing to the combined effects of the new Kembs canal and the work of regulation of the river itself, the record achieved in 1930 is the beginning of a new development of activity, which will justify the confidence in the work accomplished and the expenses connected therewith.



An artist's conception of the finished appearance of the Steamship Champlain, 28,600 gross-ton liner, launched August 15 for the North Atlantic service of the Compagnie Generale Transatlantique.

French Liner Construction

Some Notes on Outstanding Vessels Now on the Stocks in French Shipyards

By R. C. W. Courtney

ALTHOUGH the French mercantile marine is, in common with those of other countries, experiencing its full share of the present world-wide trade depression, several important high class liner contracts are in process of completion, whilst delivery has recently been effected of the 40,000-ton L'Atlantique, the second largest ship to be completed during the present year.

The most outstanding vessel at present on the stocks in France is, of course, the Compagnie Generale Transatlantique's mammoth liner for the Havre-New York service, on which work is proceeding apace at the Penhoet shipyard of the Chantiers et Ateliers de Saint Nazaire. According to details recently released, the Super Ile de France, as she is provisionally named, will run very close to the Cunarder as regards size, although the power of 160,000 shaft horsepower will be below that of the British ship which, according to the latest reports, is to have upwards of 200,000 shaft horsepower. The over-all length will be about 1017 feet (310 meters), and the beam 115 feet (35 meters), the provisional figure for the displacement being 70,000 tons. As regards the machinery installation, the most interesting feature is the adoption of turbo-electric drive; so that the plant will easily be the largest of its kind yet fitted in a merchant vessel. The boilers are to be of the high pressure water-tube type of a design developed by the hull builders and which it is understood have given excellent results in various French naval craft. In common with some of the latest liners flying the tricolor, the new ship will depart somewhat from the orthodox as regards external appearance; and a preliminary silhouette shows a long overhanging bow, lofty superstructure, with three widely spaced smoke stacks of varying heights, the foremost being the highest. Completion apparently will not be effected until the early part of 1934, whilst considerable harbor extensions and dredging have to be carried out contemporary to the construction.

Steamship Champlain

A smaller but very distinctive ship for the Compagnie Generale Transatlantique's North Atlantic service was launched by the St. Nazaire builders on August 15, last. This is the 28,600-ton steamship Champlain. This vessel is of similar type to the diesel-driven Lafayette commissioned last year but has been equipped with high pressure geared turbines and water-tube boilers. The over-all length is 640 feet 6 inches, with a beam and depth of 83 feet and 50 feet 6 inches, and a loaded draft of 30 feet 6 inches. Accommodation is provided for 645 cabin, 185 tourists, and 131 third class passengers, together with a crew of 559. The power plant comprises two sets of Parsons 3-casing-type turbines, each operating a shaft through single reduction gearing and having a normal rating of 25,500 shaft horsepower at 127 revolutions per minute for maintaining 20 knots in service. Steam will be generated at 400 pounds pressure and 662 degrees Fahrenheit, final temperature by six Penhoet water-tube boilers in two compartments, four being located in the forward and two in the after boiler room. Two Scotch boilers of 180 pounds pressure for auxiliary and hotel services will also be installed aft, whilst oil-firing on the builder's system is to be used throughout. As will be seen from the accompanying illustration, the appearance of the ship is extremely unorthodox and will no doubt invoke considerable discussion in shipping circles. The main features are the development of the raked plate stem, lofty superstructure, disposition of the masts, and unusual stack equipped with a French naval pattern smoke deflector.

Steamship L'Atlantique

Reverting to L'Atlantique, this fine liner has also been built and engined at the St. Nazaire yard, but is for the South American service of the Compagnie de Navigation Sud Atlantique operating between Bordeaux, Rio de Janerio, Montevideo, and Buenos Aires. The over-all length is 733 feet, the beam 92 feet, depth 67 feet 3 inches, and displacement is 40,000 tons, the draft of 26 feet 3 inches being restricted for navigating the River Plate. The design in this case is more on orthodox lines, with a straight stem, cruiser stern, three widely spaced stacks of normal shape and two masts. There are nine decks devoted to passenger accommodation, five of which are continuous right fore and aft and the cargo space measures 126,000 cubic feet. The hull is built to Bureau Veritas survey, with an extensive adoption of special high tensile steel for the topside plating, tank tops, strength decks, and stringers. Compensating web frames and girders are fitted in the large public rooms, whilst two expansion joints have been arranged in the superstructure. 1238 passengers are carried in four classes, with 663 in the crew, and, as is usual on the South American service, the accommodation is on luxurious lines with the general style of decoration conforming to Modern French ideas.

The power plant consists of four sets of Parsons turbines, each comprising a high, intermediate, and two low pressure units operating a single propeller shaft through gearing and being the first instance where four turbines have been arranged to drive one shaft. For astern running, blading has been incorporated in the intermediate and low pressure turbines. Steam is provided at 227 pounds pressure by 16 double-ended Scotch boilers in two compartments, eight being of the 8-furnace and eight of the 6-furnace type, the respective diameters being 17.7 feet and 16.25 feet. Each boiler has two superheaters to maintain a final temperature of 644 degrees Fahrenheit, and oil fuel is exclusively burned on the Wallsend-Howden system. Following the practice of some of the larger German-built liners, such as the Leviathan and Bremen, the uptakes from the boilers have been divided to allow of a central through way connecting the various public rooms.

An interesting feature of the purchase of auxiliary equipment is that a fairly extensive use has been made of the Dawes Plan of reparations in kind from Germany, and included amongst the fittings of this nature are the electric-hydraulic steering gear, the cargo winches, lifeboats and gravity davits, and various sanitary appliances. The designed speed is 21 knots with the propelling plant registering 45,000 shaft horsepower, but it is understood that both of these figures were easily exceeded on trials.

Messageries Maritimes' Motorships

In addition to augmenting the North and South Atlantic services, French shipowners are also building high class tonnage for improving communications with the Oriental, African, and West Indian colonies of which a few of the most important examples may be briefly described. Mention should first be given to the constructional program of the Messageries Maritimes of Marseilles consisting of a series of motor liners ranging between 12,000 and 16,000 tons gross, four of which have been commissioned or launched during the past twelve months. The latest is the Aramis, launched in June by the Forges et Chantiers de la Mediterranee, with dimensions 564 feet by 69 feet 9 inches by 47 feet and a gross tonnage of 15,000. Accommodation is provided for 185 first, 133 second, and 650 steerage passengers, whilst 10,200 tons of cargo are carried. The machinery consists of two 10-cylinder, Sulzer, 2-cycle, single-acting diesels developing a total of 11,600 brake horsepower for propulsion and five Sulzer-type, 400-kilowatt generating sets, the whole plant having been built in France under license. The service speed is 17½ knots, and a noticeable feature of these Messageries Maritimes motorships has been the provision of large exhaust funnels or stacks of rectangular section but which so far do not appear to have been adopted by any other concern.

Steamship Colombie

For the Carribean service of the Compagnie Generale Transatlantique, a noteworthy ship of its type has recently been delivered in the Colombie, recently constructed at Dunkirk by the Ateliers et Chantiers de France. The over-all length in this case is 498 feet, with a breadth and depth of 66.3 feet and 46.2 feet, the total displacement on 23 feet being 13,900 tons, and the gross tonnage 10,600. Provision is made for 494 passengers and a crew of 251, whilst the carrying capacity will be 4800 tons inclusive of large insulated spaces for the carriage of bananas.

Twin sets of single reduction geared turbines developing 8000 shaft horsepower at 120 revolutions per minute for 16.75 knots and taking steam from seven single-ended Scotch boilers at 227 pounds pressure are installed. An interesting feature is the provision of two independently fired superheaters each capable of raising 44,000 pounds of steam per hour at 598 degrees Fahrenheit.

Steamship Djenne

A typical example of the smaller type of French passenger liner for the short distance African service may be given in the Djenne built by the Forges et Chantiers de la Mediteranee for the Compagnie Paquet's service from Marseilles to Morocco and Senegal. Having dimensions of 444 feet overall by 58.4 feet by 36.9 feet to the upper deck, the ship is of 8790 tons gross and displaces 10,800 tons on 23.5 feet. Accommodation is provided for 453 passengers in three classes, in addition to 17 special suites arranged on the promenade deck, whilst the deadweight capacity is 5000 tons. The propelling machinery of the Djenne is also of the twin-screw, single-reduction, geared-turbine type and gives 8000 shaft horsepower at 125 revolutions per minute for maintaining 18 knots, the trial speed being 18½ knots with 8919 shaft horsepower. The steam generating plant is of special interest as it consists of six boilers of the semi-cylindrical, semiwater-tube Prudhon Capus type with superheaters and oil firing on the Todd system, the working pressure being 227 pounds and the final temperature 662 degrees Fahrenheit.

Marine Refrigeration Simplified

A Series of Articles on the Handling of Perishable Products on Shipboard from the Ship Operator's Standpoint

Part XII — Construction of Refrigerated Rooms Aboard Ship

By L. L. Westling

THERE are as many methods of building refrigerated spaces as there are men to design them. There are unlimited combinations of materials that may be used, and many methods of construction, some of which are patented.

To outline the more generally used materials and methods, there follows a group of specification clauses from which may be assembled a complete specification for the construction of a cold storage plant aboard ship. These clauses are written for installation in existing ships, but with slight alteration they can be applied to new construction.

In subsequent chapters there will appear specifications covering the installation of the machinery and mechanical part of the plant, and there will also appear an assumed problem which will outline the calculations which usually precede the writing of specifications.

Specifications for the Installation of a Cargo Cold Storage Plant Aboard the Steamship . . . .

(General and legal clauses omitted)

1. General

The builder shall provide all labor and materials for the complete installation of the refrigerated spaces and for all mechanical equipment specified herein. The arrangement shall be as shown on the contract plans. There shall be.....chambers, located on the ...... deck between frames ..... and ....., on the ......side of the vessel. These spaces to be used for ....* cargo.

The net stowage space shall be approximately.... cubic feet and shall be refrigerated by the ......System.**

The installation shall be in accordance with the requirements of the classification societies and the United States Steamboat Inspection Service.

2. Preparation of Space

(a) All steel work in the refrigerator rooms shall be sand-blasted to remove all scale, paint, and rust, and all refuse shall be removed from the ship.

(a_1) All steel work shall be chipped and wire brushed, and all refuse removed from the ship.

(b) All holes in the deck shall be closed off water-tight in an approved manner, and all drain piping in way of the insulation shall be overhauled and made tight. All other piping, mechanical telegraph systems***, etc., shall be relocated to clear insulated spaces in an approved manner.

(c) All steel work except the deck and deck-head shall be given one heavy coat of bituminous solution and one coat of bituminous enamel not less than one-eighth inch in thickness. The deck and deck-head to have two coats of solution only.

3. Construction Materials

(Because of the general usage of cork, these specifications will not embrace many meritorious insulators available on the market. The designer can readily substitute his choice of material to suit his requirements.)

(a) All woodwork shall be of No. 1 grade Oregon pine, and all concealed lumber shall be water-proofed after being cut to fit.

(b) All granulated cork shall be pure and clean, and free from hard bark or adulterations.

(c) All corkboard shall be made of pure granulated cork with natural resin binder, baked and hydraulically pressed. It shall have a weight of . .pounds per board foot.

(c_1) All corkboard shall be of granulated cork, with an approved artificial binder.

(d) Asphaltic cement shall have a minimum melting temperature of 200 degrees Fahrenheit.

(e) Water-proof paper shall be ...-ply, of approved manufacture.

(f) All nails, fastenings, hardware, steel work, piping, etc., are to be galvanized.

4. Insulation of Ship's Side (and Stiffened Bulkheads)

(a) On the flange face of channel frames and against knee brackets a 2-inch thick furring strip shall be bolted. On the inboard face of these shall be laid two layers of water-proof paper and one layer of 1¼-inch tongue and groove pine. The space between the shell and the sheathing shall be filled with granulated cork, tightly packed. The inboard face of the brackets shall be insulated with 2-inch corkboard to insure insulation should the granulated cork settle.

(a_1) Against the web of the frames and extending one inch inboard from the face of the frame flange, a furring strip 2 inches thick shall be bolted and insulated as in (a).

(a_2) Against the web of the frame and flush with the flange shall be bolted a 2-inch thick furring strip, over which shall be laid one course of 7/8-inch tongue and groove pine. Over this sheathing a studding of corkboard thickness shall be nailed, spaced to corkboard length. The studding shall not be laid over a

*As cooler, chill, freezer, sharp freezer, or as convertible cooler or freezer, etc.

**Ammonia-direct-expansion, ammonia-brine, carbon-dioxide-brine, etc.

***It is sometimes necessary to run each telegraph wire through a 1-inch pipe buried in the insulation.

frame flange or furring strip. Over the sheathing and studding shall be laid two thicknesses of water-proof paper. Between the studs shall be laid.... inch corkboard with the edges dipped in hot asphalt; and over the cork two layers of water-proof paper. Over the studs, cork, and paper shall be laid one thickness of 7/8-inch tongue and groove pine, one layer of paper, and a second layer of tongue and groove pine to be at right angles to the first course of tongue and groove.

(a_3) Over the face of the frames erect a sheathing of 3/16-inch steel plate, which may be bolted or tack-welded to frames and at the plate edges. Over the steel, lay two layers of corkboard with total thickness of .... inches and with broken joints, the cork to be secured in place with an approved bituminous cement whose melting point is not less than 200 degrees Fahrenheit. Over the corkboard lay a coating of bituminous filling not less than .... of an inch in thickness and troweled smooth.*

(*There are many such materials on the market, and the manufacturers' recommended methods should be specified.)

5. Insulation of Deck-Head

(a) All protruding steel structure shall have not less than 2 inches of corkboard insulation. Between-beam spaces shall be insulated after the same manner as the ship's side with granulated cork after the meat rail hangers have been installed. Tongue and groove sheathings shall be laid in short lengths in the way of concealed piping to facilitate repairs. All openings in the way of the angle rail hangers shall be sealed with a plastic cement.

(a_1) Against beams, bolt furring strips flush with the beam flanges, over which lay one course of 1¼-inch tongue and groove pine; the between-beam spaces shall be tightly packed with granulated cork, with wood stoppers every four feet*. Against the sheathing lay carlines of corkboard thickness spaced to corkboard lengths. No carlines shall be laid over beam flanges or furring strips on beams. Over sheathing and carlines lay one layer of water-proof paper, one course of ....-inch corkboard with the edges dipped in hot asphalt, two layers of water-proof paper, and one layer of 7/8-inch tongue and groove pine.

(a_2) To the beams weld a 3/16-inch steel plate as at ship's side and fill between-beam spaces with granulated cork. Secure two layers of corkboard to the steel sheathing with bituminous cement, and lay one coat of bituminous coating not less than .... of an inch in thickness, the same to be troweled smooth.

(*The last opening of the sheathing may be effected, filled by forcing in a burlap sack filled with granulated cork.)

6. Partitions or Refrigerator Bulkheads

(a) Rabbetted sills shall be bolted to the deck, imbedded in an approved cement, the bolt heads to be welded to the steel deck and spaced approximately two frame spaces. Similar plates shall be secured to the deck head, and between the sill and plate shall be installed studding of corkboard thickness staggered on centers of one-half corkboard lengths. Between studs lay two layers of ....-inch corkboard with edges dipped in hot asphalt, thus making a cork wall of .... inches thickness. Over the two faces of the cork, lay two layers of water-proof paper, one layer of 7/8-inch tongue and groove pine, one layer paper, and a second layer of tongue and groove pine at right angles to the first course.

(On partitions or bulkheads adjacent to dry cargo spaces the exposed face shall have one layer of 1½-inch tongue and groove pine only. On bulkheads along cargo hatches exposed to cargo damage there should be 4x4-inch spars spaced approximately one frame space to protect the sheathing).

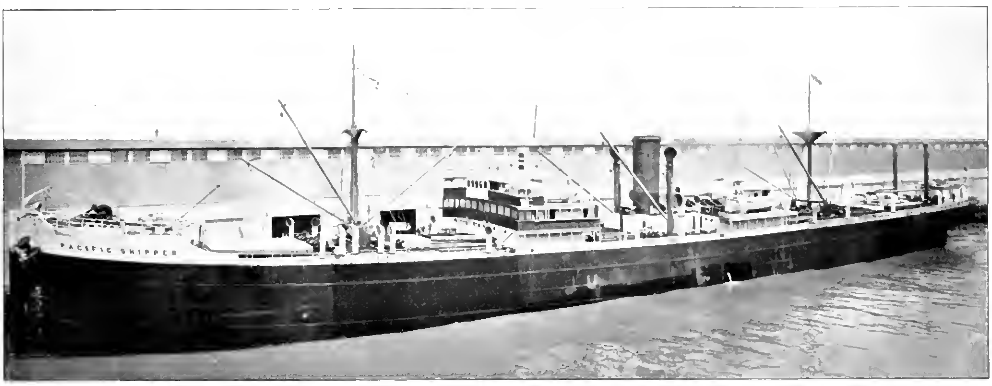
The exposed corners of insulation in dry cargo spaces shall be sheathed 6 inches on each face with galvanized steel plate 1/8-inch thick.

(b) All partitions and deck-heads shall be made rat-proof by laying one layer of ½-inch mesh, No. 18 wire, galvanized iron mesh within the insulation.

(c) Between decks raise a 3/16-inch steel plate bulkhead, the edges of which shall be flanged 2 inches. For partitions between refrigerator spaces, the flanging shall be on opposite faces (Z-shaped) and spaced to one length of corkboard. On bulkheads between refrigerator and dry cargo spaces, the 2-inch flanges shall be on the refrigerator face only, the flange on each plate (L-shaped) spaced to corkboard lengths.

Between flanges, lay...-inch corkboard in approved cement, the refrigerator faces to receive one coat of bituminous filling not less than ...-inch in thickness and troweled smooth.

(Please turn to Page 518)



The Furness Pacific Coast-Europe cargo liner Pacific Shipper is an excellent example of the modern freighter equipped with large refrigerated and cooled cargo space.

Dieselization of Transportation

One of the New Industries of the Next Prosperity Era

By Edward B. Pollister*

IN this readjustment period we must first scale down our ideas of prosperity from the peak of 1929 to a normal year, with most of our workers gainfully employed and most of our industrial capital profitably invested to supply the demands of our 122,000,000 people. Then, there must be sought and developed those new industries which will mark the progress of civilization during the next prosperity era. One of these will be the dieselization of American transportation—air, highway, rail, river, and ocean.

In the short period of twenty years, transportation has come to mean more than railroads. It now embraces the new airways, the thousands of miles of hard surfaced highways, the common carrier pipe lines, powered with efficient diesel engines, and—because of our export trade—the time has come when low cost river and ocean handling of bulk freight from the interior of our country all the way to foreign markets must be included in one general system of American transportation.

Airways

Looking into the future, large transport planes, carrying as many passengers as a railroad Pullman, at a speed of 200 miles per hour, will demand power plants of several thousand horsepower. The compression-ignition diesel for air service is being developed to assure fuel economy, minimum fuel load, low fuel cost, increased radius of operation, and safety of passengers against explosion and fire in forced landings.

Development of the larger air diesel will be away from the single crank rotary engine toward the "V" or straight line, multicrank, fluid cooled, single acting motor. For dirigibles, a central diesel electric power plant, with most advantageously placed motor driven propellers, offers advantages of flexibility in control, security of suspension and reduction in operating personnel.

Highways

Highways have always been feeders to railroads. It follows that improved highways should have become improved feeders to railroads, not competitive means of transportation. National hard surfaced highways bring remote towns and villages nearer to main railroad trunk lines and offer attractive possibiiities of regular bus and truck connections with through fast railroad trains, for both passenger lines and express freight service.

The coming of the automobile truck made possible the advantageous handling of less than carload freight by the railroads from door to door, shipping point to destination. This is a step forward in transportation service. Abroad, diesel power has been adopted for buses and trucks to give low cost service.

Railroads

Use of the diesel-electric locomotive will be fostered by the great electrical interests, both electrical manufacturing and electric power producing companies. The electric locomotive of the future, except for limited service on all electric runs, will be fitted with its own diesel-electric generating plant, operating as an electric locomotive on electrified portions of a railroad system and instantly changing to diesel-electric operation beyond the zone of electrification. The diesel locomotive will carry in its tender sufficient fuel oil for a day's run or more and will require no addition to its cooling water supply for such a period. It will operate with a minimum of servicing equipment and personnel to man relatively few division service stations.

Inland Waterways

Normal development of the vast interior of the country demands lowest cost transportation. The courageous pioneer railroad-building into the interior of the country alone permitted its early development; and now the prosperity of these same railroads is menaced by the new forms of transportation.

It is the province of a midwestern transportation system to seek to best serve the farmer of the interior by combining short rail haul to the nearest waterway with inexpensive Mississippi River transportation to the Gulf, utilizing fully this great natural downhill water highway to serve agriculture with minimum transportation costs on export products that must compete in delivered price in foreign markets with more favorably located seaboard farm products of other nations.

In Germany, bulk freights are floated down the Rhine, Elbe, and Weser rivers in huge convoys of barges to the ports of Rotterdam, Hamburg, and Bremen. Diesel engines are already extensively employed on such inland waterway transportation systems of Europe, since they require minimum fuel, small operating crews, and low stand-by expense.

Ocean Transportation

The extent to which diesel-propelled vessels are being now utilized by the various foreign countries in their ocean trade is disclosed by a report of the Bureau of Research of the United States Shipping Board, which shows that on January 1, 1931, Great Britain had 327 diesel ships, Japan 49, France 15, Italy 57, The Netherlands 59, Norway 238, Germany 75, Sweden 77, and Denmark 60.

With recent naval treaties limiting our warships, the increased value and importance of merchant ships used as naval auxilaries is apparent in our plans for national defense.

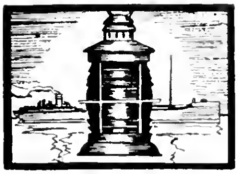
With our scarcity of foreign naval bases, we need longer radius ships; and many of these foreign fast diesel merchant ships can go around the world without refueling.

It is safe to conclude that, during the next ten years, between 500 and 1000 modern fast economically propelled cargo ships must be built to replace obsolete tonnage, maintain the economic position of our American merchant marine on the high seas in time of peace, and safeguard the parity of our combined warship and merchant ship fleets in time of war.

During the next prosperity era, among other new industries, the dieselization of American transportation will provide work, advance aviation, curb destructive highway competition of the railroads, and stimulate all lines of business affected, including manufacturers of electric and railroad machinery, machine tool and allied equipment, ship building, the oil industry, and some fifty diesel engine builders.

[Manufacturer's Record]

*President, Busch-Sulzer Bros. Diesel Engine Co.



Marine Equipment

NEW ALLOY STEEL ∾ ELECTRIC TROLLEY HOISTS
NICKEL-CLAD PLATE ∾ STEAM PURIFIERS

The Atlantic Works of Bethlehem

EAST Boston was a name to reckon with in early American shipbuilding circles. Here in 1853 there were twenty-two shipbuilding plants, and here were built some of the most famous of the American clipper ships. Here, in 1847, was founded the East Boston Dry Dock Company to operate docks and marine railways; and in 1853 the Atlantic Works was incorporated to build engines and boilers. The Atlantic Works soon got into business of applying iron in ship construction; and during the Civil War built two monitors and the turrets and power plants for a large number of those interesting craft. In 1902 the Atlantic Works absorbed the East Boston Dry Docks, and in 1926 the consolidated plant of these two firms was acquired by the Bethlehem Shipbuilding Corporation and immediately plans were prepared for the modernization of the plant.

The entrance to the Atlantic Works of Bethlehem Shipbuilding Corporation at East Boston.

The alterations and additions contemplated in these plans have recently been completed, and now the Atlantic Works presents the layout and facilities of a thoroughly modern repair plant for the hulls and the power plants of small and medium sized vessels up to 450 feet in length.

These works cover a ground area of approximately fourteen acres, and the actual floor space in the shops is approximately 60,000 square feet. There are 1990 feet of outfitting pier available with mean low water depth of 25 feet, served by a 15-ton traveling jib crane, a 10-ton caterpillar crane, and a 100-ton shear legs; and equipped with air lines, electric outlets, and fresh and salt water lines.

The docking facilities consist of two floating docks of 360 tons and 5500 tons capacity, and three marine railways of 500 tons to 2000 tons capacity. All shop equipment is electrically operated by direct drive, there is abundant provision of power outlets for portable electric tools, and unusually good lighting facilities on docks, piers, and in the shops.

Shops include: The finest marine machine shop in New England; a pipe shop equipped with six threading machines to take pipe from 2 to 12 inches in diameter; a fully

Part of the interior of machine shop at the Atlantic Works, East Boston.

... copper shop; a boiler ... including in its equipment ... items as a 57-ton and a 70-ton hydraulic flanging press and rolls for $1\frac{1}{4}$ inch plate and well outfitted to carry on any blacksmithing, sheet metal or fabricating work; a carpenter and joiner shop; a welding department; a mold loft; a pattern shop; a rigging shop; a paint shop; and an electric shop.

Auxiliary equipment includes three gasoline workboats, one 75-ton scow, eight automobile trucks, four automobiles, and a barge equipped with the Wheeler system of cleaning tanks and bilges.

In addition to the Atlantic Works at East Boston, Bethlehem Shipbuilding Corporation owns and operates the Simpson Works nearby. This plant is equipped to take care of the repairs of larger vessels and much of its equipment is available when needed for work at the Atlantic Works. Not far off also is the famous Bethlehem Fore River Plant especially designed and equipped to build any type of seagoing craft.

An Alloy Steel for Use as Rolled

ONE of the great disadvantages attending the widespread use of alloy steels has been the necessity of treating these materials in order to develop their potential worth. Such practice frequently calls for expensive heat-treating and pickling operations, and extreme care must be maintained to insure keeping the steel in this heat-treated condition so that its valuable properties will not be impaired.

This problem has been greatly simplified by the recent development of a series of low-alloy steels containing chromium, manganese, and silicon. These new alloys have been introduced under the name of cromansil steels, a general term used to designate not one special steel, but all steels whose composition comes within the recommended range of alloy content.

The most useful forms of cromansil steel contain from 0.4 to 0.6 per cent. chromium, 1.1 to 1.4 per cent. manganese, and 0.7 and 0.8 per cent. silicon, with a carbon content ranging from less than 0.10 to 0.65 per cent., depending upon the particular use to which the steel is to be put. The presence of these three elements in combination results in high ultimate strength, great ductility, high fatigue limit, high impact strength, and ready machinability. Another important effect is the increase in latitude of allowable finishing temperature of rolling. This property alone is of great aid in producing a "foolproof" steel.

Easily manufactured by the open hearth process, these steels can be used as rolled, or in the heat-treated condition. By selection of appropriate alloy percentages it is generally possible to obtain the desired physical properties without any heat-treatment or with a simple normalizing, with or without subsequent tempering. Greater strength and ductility than any form of plain carbon steel can be obtained in the as rolled condition.

Cromansil steels can be made by any skilled steel maker without additional experience or training, and can be produced in the open hearth at a slight increase in cost. They can easily be rolled into billets, plates, bars, and any shapes ordinarily fabricated from carbon steel, forging, and piercing and drawing into seamless tubing can also be accomplished according to the usual practice. All fabrication operations such as punching and drifting can be carried out with comparatively little additional trouble or expense.

Welding is performed according to the usual procedure control for ordinary carbon steel of the same shape. Except for plates over one inch in thickness or steels having a high carbon content, no subsequent heat treatment is necessary. Normalizing is all that is required in any case to bring the strength of the weld up to that of the base metal.

A few of the applications in which this type of steel is especially advantageous are ship plates and naval structural parts, bridges and buildings where a high strength-weight ratio is valuable, chimneys, penstocks, pressure vessels, tanks, boilers, staybolts, and high-strength seamless tubing such as oil well casings. The improved physical properties or cromansil steel meets the requirements of such applications and at the same time remove to a great extent the need for heat treatment to develop desirable characteristics.

The properties and applications of these alloys are described in detail in a 12-page technical bulletin on "Cromansil Steels" issued by the Electrical Metallurgical Company.

An Improved Line of Welding Sets

THE General Electric Company announces a new line of single-operator welding sets in which are incorporated many improvements over past designs. This has been designated the WD-20 line as the types are numbered WD-21, 22, 23, 24, and 26, covering the 100-, 200-, 200-, 400-, and 600-ampere ratings, respectively.

It includes both portable and stationary sets, the basic form being stationary with but a slight change needed to make it portable. Types include those for operation on either alternating or direct current at all standard voltages and, in the case of alternating current, standard frequencies and 2 and 3 phase gasoline-engine-driven sets will also be available.

A typical alternating current set consists of a generator with an overhung driving motor mounted on a simple base to which is attached a strong sheet-metal control cabinet enclosing the generator control devices, meters, and motor starting equipment. A specially designed transformer-reactor is mounted in the base under the generator. Base supports are arranged to be bolted to the floor or to have axles and wheels readily attached. The whole assembly occupies a minimum of space, a typical 300-ampere, alternating current set standing 36 inches high and 50 inches long by 23 inches wide. The weight of such a set is 1865 pounds.

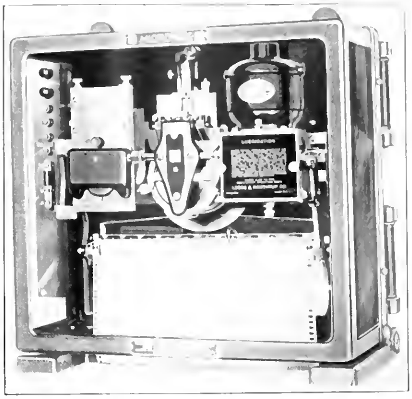
Among the many improvements are the following:

1. Practically instantaneous voltage recovery from short circuit to nearly full open circuit voltage, thus giving a quickly responsive arc.

2. Duplex voltage control by the operator over a wide range with the particular provision of a surplus voltage which can be used when it is necessary to use very long welding leads.

3. Simplicity of operation, a method of control being adopted for which the majority of welding operators have shown a preference.

An Improved Temperature Recorder



Micromax, the improved Leeds & Northrup potentiometer pyrometer.

AN improved potentiometer pyrometer, Micromax, which was recently announced, is an instrument that is worthy of investigation on the part of pyrometer users. Micromax achieves a new high level of accuracy, reliability, and strictly automatic operation. This improved instrument requires no manual adjustments. It needs no daily attention. It eliminates the "human element" in operation. The instrument circuit is standardized automatically, every 45 minutes or less, giving a closer adjustment. Manual adjustment of the stepping action is no longer necessary. Micromax is, in every detail, a fully automatic potentiometer pyrometer.

By virtue of its microscopically sensitive balancing device, Micromax can detect and record deflections of the galvanometer pointer amounting to 1/1000th of an inch. This sensitivity makes the recorder action responsive and speedy, sending the pen or print wheel across the chart paper in steps that are much more accurately proportionate to the temperature change. If necessary, the recording pen or print wheel can step across the entire chart in less than 22 seconds, the size of each step being closely related to the extent of galvanometer pointer deflection. It is evident, especially in automatic control and where more than one temperature is being measured, that this rapid recording feature is a long desired advance in industrial temperature control.

Micromax is put forward by its makers as a basic contribution to the advancement of industrial pyrometry. Micrometer sensitivity, automatic standardization, and rapid recording are now combined with the established accuracy and reliability of the potentiometer circuit.

All models of Micromax have been in full production for several weeks. All models are available in the usual schedule of deliveries. A new catalog No. 87, describing the instruments in detail, has been issued by the manufacturers, Leeds and Northrup Company of Philadelphia.

Radiomarine Lifeboat Radio Put to Practical Test

SUCCESSFUL practical tests were made by the Radiomarine Corporation of America of its new, especially designed radio equipment for lifeboats, when a completely equipped lifeboat put out under power of her own gasoline motor from the yards of the Welin Davit & Boat Corporation at Long Island City for a test run in the East River.

The Radiomarine Corporation's station at New London, Connecticut, had no difficulty in picking up the boat's signal on 600 meters, which is the channel usually employed for emergency communication. This demonstrated that the equipment will maintain communication on the distress frequency over at least 100 miles.

One of the features of this lifeboat radio equipment, which will become a part of the Matson Liner Mariposa now under construction, is that it is capable of transmitting in the short wave band. Tests were made on 54 meters and signals were picked up by New London and other points along the coast. So clearly did these signals carry that they were heard and reported as very strong by the Harrisburg, Pennsylvania, airport radio station, which had no previous knowledge that the experiments were to be conducted. This shows that these lifeboats would be able to keep in communication on the short wave length at distances of several hundred miles.

An Efficient Steam Purifier for Marine Boilers

THE Centrifix Corporation of Cleveland, Ohio, have developed a highly efficient steam purifier for boilers which delivers clean, dry steam, permanent separating efficiency, prevents priming, is self-cleaning, requires no maintenance, and is easily installed, going through any standard manhole.

The purifier is simple in construction and consists of three parts—an upper race casting, tuyere blade assembly, and lower race casting. There are no rotating parts. A whirling motion is imparted to the steam as it enters the fixture through the tangentially arranged blades, throwing off the heavier particles—both water and solids—allowing only clean, dry steam to pass on into the line. The purifier is provided with two races or collecting chambers. The lower race is designed for handling slugs in case of priming, and as much as the usual entrainment cannot be supported by the steam in its upward travel; the upper race at the outlet removes the balance of entrained water and solids carried along with the flow of the steam. Two eject pipes, each of which is fitted with a "valveless check," discharge the water from the races into the boiler.

Actual tests on marine boilers have shown 99.94 per cent. steam quality with less than three tenths of a pound pressure drop. Fuel savings have been as high as 7 per cent.

Cordes Bros., 200 Davis Street, San Francisco and 524 Avalon Boulevard, Wilmington, California, are the marine representatives on the Pacific Coast for products of the Centrifix Corporation. They will be glad to furnish you with descriptive matter and further details.

Nickel-Clad Steel Plate

THE Lukens Steel Company has recently announced that its latest product—a nickel-clad steel plate is now available in all thicknesses of plate from 3 16-inch up and in two grades, namely: Grade A with the solid nickel 10 per cent. of the plate thickness, and Grade B with the solid nickel 20 per cent. of the plate thickness.

This product is a hot rolled plate made up of a layer of pure, solid nickel and a heavier layer of high-grade flange steel. The plate has all the advantages of pure solid nickel and the strength of steel. It makes practical many heavy plate constructions where both corrosion resistance and non-contamination are essential.

Methods of welding and of riveting have been developed with this new plate that have already proved highly satisfactory in maintaining a continuous inner surface of nickel in such construction as tank cars, evaporator shells, tanks, and mixer bodies. It is indicated that nickel-clad steel plate may prove highly desirable for condenser, evaporator, and distiller shells in marine engine rooms, and for certain tank and piping requirements aboard ship.

Nickel-clad steel plate is available in all types of dished and flanged heads and in other forms. The product is handled on the Pacific Coast by the Pacific Metals Company, Ltd., of San Francisco and Los Angeles, and by the Eagle Brass Foundry Company of Seattle.

Trade Notes

Westinghouse Appoints Karelitz.—Dr. George B. Karelitz, formerly manager of the mechanics division of the Westinghouse research laboratory in East Pittsburgh, has been appointed division engineer in charge of transportation at the South Philadelphia works of the Westinghouse Electric and Manufacturing Company. His duties will include supervision of the manufacture of marine apparatus, diesel oil engines, and other equipment.

Dr. Karelitz was born in Petrograd, now Leningrad, Russia, in 1895, and graduated in naval architecture and mechanical engineering from the Petrograd Polytechnical Institute. He saw service in the Russian navy during the World War, spent a few years in China, Japan, Korea, and Norway, and came to the United States and Westinghouse in 1922.

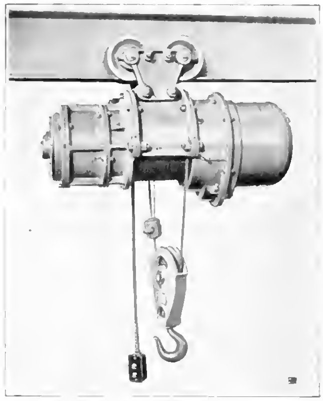
R. E. Peterson, research engineer, has been named to succeed Dr. Karelitz as manager of the mechanics division of research.

Boat Trains for Malolo.—Two fast transcontinental boat trains, operating without change of cars direct from the Atlantic to the Pacific Coast to connect at San Francisco with the speedy liner Malolo, will again feature the winter travel movement to Hawaii.

Under the unique schedule, made possible by the cooperation of five from New York to Honolulu is narrowed down to eight days (seven days from Chicago) and the only change of accommodation is from train to ship at San Francisco.

The first Malolo boat train major railway systems, the trip leaves New York on Tuesday, January 19, to connect with the sailing of January 23. The second boat train leaves New York, February 2, connecting with the Malolo sailing of Saturday, February 6.

This four-foot model of the Steamship President Hoover, made in Hawaiian cane sugar by Alfred Gfroerer, chef of the Alexander Young Hotel, Honolulu, was presented to Captain Fred E. Anderson of the liner by Manager Fred R. Goodall of the hotel at a luncheon given by the Honolulu Chamber of Commerce in honor of the Steamship President Hoover's maiden appearance at that Port.



Electric Trolley Hoists

THE new line of Wright electric trolley hoists is complete in every respect, consisting of plain, geared, and motor-driven trolley types. The bearings of the trolley wheels are designed to absorb both radial and thrust loads, thus reducing to a minimum the effort to move the trolley along the I-beam.

In the motor-driven trolleys, the wheels are driven on each side of the I-beam insuring smooth operation, and are equipped with a safety stop. Controllers for single speed, two speed, or variable speed can be furnished.

These hoists can be mounted either parallel or at right angles to the runway beam. While the standard lift is 18 feet, lifts of 9 or 36 feet can be furnished.

Features of these hoists include full size drums for long cable life, push button or pendant rope control, Tru-Lay preformed cable, Safety type limit switch, positive braking, and weather proof motors.

Pacific Marine Review

The Kolster Radio Compass

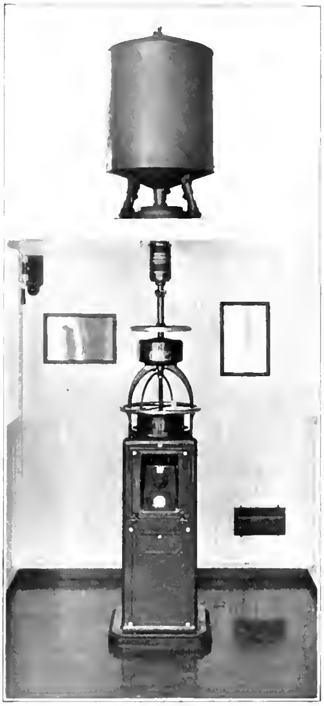
THE Kolster Radio Compass is the original compass or direction finder. It was invented and perfected by Dr. Frederick A. Kolster, who still takes an active part in its manufacture.

The Kolster Radio Compass is a compact unit which has been constructed to operate efficiently under all conditions encountered on sea-going vessels. The rotating loop, or antenna, of the compass which is outside the pilot house, is enclosed in a non-conducting composition housing which thoroughly protects it from the weather and from spray. The receiver and batteries supplying current to the vacuum tubes are enclosed in an attractive cast aluminum cabinet, which harmonizes nicely with present-day navigating instruments. The panel of the receiver is set in a small recess to avoid damage to the controls. The operation of the receiver is by single dial control. The handwheel for rotating the loop is placed at a convenient height, which facilitates operation of the unit.

The automatic compensator gives the correct readings of the direction of the received signal, eliminating the possibility of error which is present in applying calibration corrections necessary with compasses not equipped with this automatic device.

There are many uses on board ship for a radio compass, the most common being the one applied in every day navigation in obtaining bearings on radio beacon stations established at lighthouses, on light vessels, and at harbor entrances during thick or foggy weather. Radio waves are not affected by rainy or foggy weather at distances that are useful to navigation, and the range of the radio compass far exceeds that of visual or the strongest diaphone signals. Masters coming in from deep water trips often check their positions in clear weather by means of the radio compass while the ship is still fifty or a hundred miles offshore.

Radio compass bearings can also be used to locate vessels in distress. A recent illustration is the case of the steamship Munleon, which grounded at Point Reyes. The Coast Guard cutter Shawnee requested the wireless operator of the Munleon to transmit signals, and the stricken vessel was located by means of the cutter's radio compass. When vessels are in dangerous proximity during fog, masters can obtain the bearings of the approaching vessel by requesting that radio beacon signals be sent by each vessel and bearings taken by each vessel's radio compass.



The latest type Kolster radio compass as now being installed on many American merchant vessels.

Bearings obtained by radio compass are very accurate, and masters and navigating officers can determine their distance from beacon stations by applying the same methods to compass bearings as are used in navigating by visual or sight bearings. Besides this, the Bureau of Lighthouses has developed a system of synchronized diaphone and radio beacon signals whereby a vessel's distance from beacon stations can be computed at any angle within range of diaphone signal.

The radio compass is a great time saver in shipping. It enables the master to navigate his vessel in foggy weather, assured of his position. This prevents delays when navigating in dangerous places and increases the safety factor of the vessel.

A recent and interesting example of this occurred when on approaching San Francisco on her maiden voyage, the palatial new Dollar liner President Coolidge encountered fog and thick weather opposite Point Sur, and from that point to the entrance of the harbor the vessel was navigated almost entirely by use of the Kolster Radio Compass. With the coast line, Farallon Islands, and the San Francisco light vessel completely obscured by fog, it was a case of "blind-navigating," which might well be compared to "blind flying" of airplanes solely by use of modern scientific instruments.

The radio compass has long been recognized as a highly scientific nautical instrument and is now considered as essential to navigation as the sextant and pelorus. That the U. S. Government is cognizant of this fact is proved by the increase in the number of radio beacon stations along the coasts of the United States. From eleven beacon stations operating in 1921 the number has been increased to 90 beacon stations working in 1931. Up to the present time there has been no legislation in any country compelling the use of radio compass or direction finder. However, initial steps towards international agreement in this matter were taken in the 1929 International Conference for Safety of Life at Sea.

Approximately 400 Kolster Radio Compasses, including all types, have been installed on vessels of the American merchant marine. This number represents nearly half of the total of all makes of radio compasses or direction finders now installed on American ships.

The entire Dollar line fleet of passenger vessels, including the new liners President Hoover and President Coolidge, is equipped with Kolster Radio Compasses exclusively, as are also all the vessels owned and operated by the American Hawaiian Steamship Company, and many others.

To enable future officers of the merchant marine to enter the service with a competent knowledge of the latest developments, one of the latest model Kolster Radio Compasses fully equipped with a Sperry Repeater will be installed on the California Nautical School Ship, California State.

The Kolster Radio Compass is manufactured, installed, and serviced by the Mackay Radio and Telegraph Company. H. E. Coyle is the marine superintendent for this firm on the Pacific Coast.

American Sailing Ships

AMERICAN MERCHANT SHIPS, 1850-1900. Series II. By Frederick C. Matthews. Large 8 Vo. (7x10); 370 pages; 69 illustrations. Printed by the Southwark Press, Portland, Maine. Publication No. 23 of the Marine Research Society of Salem. Price $7.50 postpaid.

Frederick C. Matthews of San Francisco needs no introduction to readers of Pacific Marine Review. His series of Clipper Ship histories, published in this magazine, his two volumes of "American Clipper Ships," published by the Marine Research Society in 1926-1927 and already out of print, and his "American Merchant Ships" by the same publisher in 1930 have all combined to recommend this author to sea lovers as a reliable, painstaking chronicler of ships and ship masters.

Like all of his former work, the present volume is an alphabetically arranged series of short, terse histories of the ships and their masters, and it includes the accounts of 171 ships in its 370 pages. Mr. Matthews has a very readable, albeit conservative, style. He has spent much of his leisure time for over fifty years collecting, comparing, correcting, and compiling data on sailing ships, and in our humble judgment is, today, America's, and perhaps the world's best authority on this subject. His sole reason for publishing these books is to get his data and information into permanent form as reference for lovers and students of the sailing ship.

Here the reader will find no glowing rhapsodies over the "glorious days of sail when the American flag was first in the ports of the world and on the seven seas." This book is a record of fact, set forth with all the reserve of true scientist or engineer making an official report. Within its covers, however, there is almost inexhaustible basic material for sea fiction, material that forms a splendid testimonial to the intrinsic worth of America's master mariners and America's merchant marine.

Copies of this volume may be obtained through the editorial offices of Pacific Marine Review.

THE STARS IN THEIR COURSES. By Sir James Jeans. Profusely illustrated. Published by The MacMillan Company. Price $2.50.

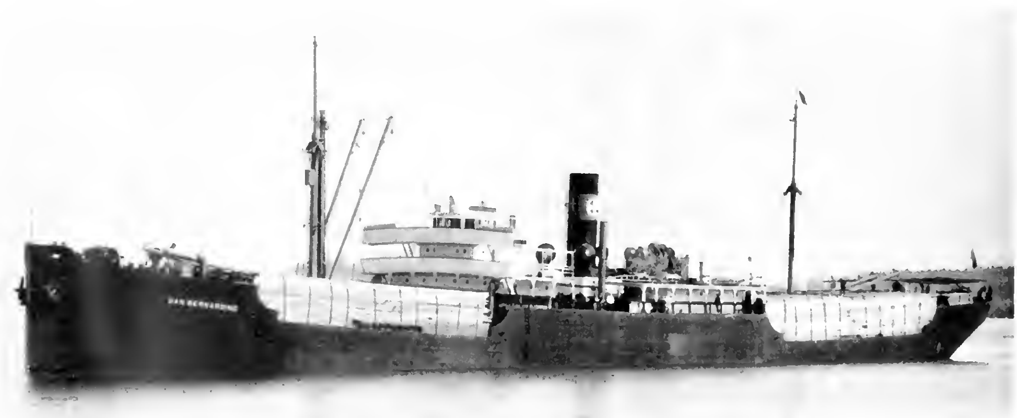
Sir James Jeans' latest book is really the gathering together in one volume the radio talks which he gave in England covering the entire family of the universe. His descriptions are made easily understandable to the average reader because of the simplicity of his language, free from technical terms and formulas. In short, he takes the reader on a visit to the moon, to the sun, —and describes and places in time and space the familiar (and unfamiliar) neighbors which we see about us in the heavens, but which very few of us can even place by name.

The book is well illustrated with maps of the heavens, and with some very fine photographs of stars, planets, and comets taken by some of the greatest astronomers in the world.

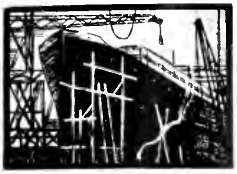
Trade Note

New United States Lines Management.—According to word received from the New York offices of the International Mercantile Marine Company, the newly organized United States Lines Company, Inc., has designated the Roosevelt Steamship Company as its manager and operator, with headquarters at No. 1 Broadway, New York, and with all the branch offices of the I.M.M. acting as agencies.

The United States Lines Company is jointly controlled by the Roosevelt Steamship Company, the Dollar Steamship Company, and Kenneth Dawson, president of the States Steamship Company of Portland, Oregon. The new organization includes the ownership and control of the United States Lines and the American Merchant Lines, operating in the north Atlantic passenger and cargo trade.



Above is a view of the lumber and freight carrier San Bernardino, part of the Quaker Line fleet operating in the intercoastal trade. On the East Coast Quaker Line vessels regularly serve the ports of New York, Albany, Boston, and Philadelphia, with calls at Providence and other ports as cargoes offer.



American Shipbuilding

Edited by H. C. McKinnon

Reconstruction Job for Pacific Coast

The Gulf Pacific Mail Line, Ltd. (Swayne & Hoyt, Ltd., San Francisco) have now about concluded their plans for the construction program required under contract with the Post Office Department over Foreign Ocean Mail Route No. 55 from Pacific Coast ports to the North Coast of South America, West Indies, and East Coast of Mexico.

The first vessel which will be rebuilt for the service is the steamer Point Ancha.

This vessel, a well deck freighter, was built by the Todd Shipbuilding Corpn. at Tacoma, and her present particulars are:

Length — 395′ 0″
Beam — 53′ 0″
Draft — 23′ 8″

Displacement at this draft, tons, 10,465

Sea speed, knots, 10.

Extensive tests have just been completed at the United States Navy's Model Basin at Washington, D.C., on which power curves were developed for the ship under her present condition, and an additional set of power curves for the ship with 15 feet of length added to the stern, with a corresponding improvement to the after lines. It is planned to cut the ship away at No. 5 hold and build a completely new stern with a new propeller and rudder of the stream-line type. It is planned to provide additional power through the installation of an exhaust turbine.

The vessel when completed will have a length of 410 feet, a cruising sea speed of above 13 knots, and a reserve speed estimated in the neighborhood of 14 knots. The midship house will be redesigned and constructed to provide for considerable additional space which will be used to provide first-class accommodations for 16 passengers. These rooms will be of good size and will be fitted out to provide facilities for comfort and convenience which will compare favorably with regular passenger liners.

It is expected that the work on this ship will commence early next year and that the ship will be ready to go into service about May of next year. The Point Ancha will be followed by an identical sister ship a few months later.

Plans for the new vessel to be constructed are also taking shape, and it is estimated that bids may be called sometime towards the middle of next year. This vessel will be similar in general dimensions to the two above described and will have the most modern type of geared turbine propulsion, and most modern and comfortable passenger quarters.

The Gulf Pacific Mail Line gives at present regular monthly sailings from Seattle, Portland, San Francisco, and Los Angeles, to Puerto Colombia, Kingston, Port au Prince, Havana, and Tampico. Irregular service as cargo offers is also offered to practically all other West Indies destinations. Provisions have been made for materially increasing this service as trade conditions return to normal.

The management has announced that the rebuilding of the Point Ancha which will definitely be done in a Pacific Coast shipyard, and will be the first construction work under the Jones-White Act to be performed on the Pacific Coast.

Steamship Point Ancha, the first of the freighters owned and operated by The Gulf Pacific Mail Line, Ltd., to be scheduled for reconditioning.

Seattle Yard Gets Repair Contract.—Lake Washington Shipyards, Houghton, Wash., have received the order from the Puget Sound Transportation Co., Seattle, for reconditioning the ferry steamer Chippewa and conversion of the boat to diesel drive. The Chippewa is to have a new type Busch-Sulzer 2-cycle mechanical injection, trunk piston diesel engine, developing 2200 horsepower and giving an operating speed of $16\frac{1}{2}$ knots. This speed will enable the ferryboat to make the Seattle-Bremerton run (for which she is slated) in 50 minutes. The structure of the hull and the accommodations will be considerably altered to accommodate the new engine and to modernize the facilities to customers.

Captain Alexander Peabody is president of the company. The work entailed by this reconditioning will cost about $150,000.

Scientific Ship for University.—Plans and specifications are being prepared by the firm of Rowlands & Strickland, naval architects of Seattle, Wash., for a floating, seagoing oceanographical laboratory for the University of Washington, situated at Seattle. The Rockefeller Foundation, which donated $200,000 for the new oceanography laboratories for the University, stipulated that $50,000 of the amount be used in the construction of the vessel. The boat will be named the Catalyst. She will be 75 feet long, 19 feet beam, and powered with a 110-horsepower Washington diesel engine, manufactured by the Washington Iron Works of Seattle. Accommodations will be provided for a crew of four and for twelve members of the scientific staff. Her laboratory will be equipped with all the latest scientific instruments needed in the studies of Oceanography. Bids will be opened in the near future.

Large Tuna Boat Building.—The Lake Union Drydock & Machine Works, Seattle, Wn., has a contract for the construction of a 126-ft. tuna fishing schooner for Portuguese fishermen of San Pedro, which is to be similar to the tuna fishing schooner Northwestern, built recently in Tacoma. The new vessel will be powered with a Western-Enterprise diesel engine.

New Towboats. — The Inland Waterways Corp., 1016 Munitions Building, Washington, D.C., is planning the construction of two towboats to cost about $400,000. General T. Q. Ashburn is chairman in charge. The boats are to be diesel powered with twin screws and will be named Huck Finn and Tom Sawyer.

Mail Contract Awarded.—The U.S. Postoffice Department, on October 31, awarded contract to The Seatrain Lines, Inc., of New Orleans and New York for the carrying of mails by water from New Orleans to Havana. The contract runs for a period of ten years, and is to start not earlier than January 1, 1932, nor later than one year from the date of the contract. The company's bid was as follows: Vessels of Class 6, $2.50 per nautical mile; Class 5, $4 per mile; Class 4, $6 per mile; Class 3, $8 per mile.

Contract Signed for Colombian Liners.—Newport News Shipbuilding and Drydock Company has been formally awarded the contract for the construction of two combination passenger and freight vessels for the Colombian Mail Steamship Company of New York. These vessels are to be 404 ft. 3 in. over-all; 57 ft. 6 in. beam; 31 ft. 6 in. depth to upper deck; 5200 gross tons, and 9490 tons displacement. They are each to be powered by Newport News impulse-type turbines designed to develop 7500 shaft horsepower and give a speed of $16\frac{1}{2}$ knots through single screw. They are to have refrigerated cargo space of 54,000 cubic feet.

The vessels will be equipped to carry 139 passengers in first class and 24 in tourist class, with a crew of about 93. The keel of the first vessel is to be laid next February and of the second next April. Each vessel is to cost about $4,800,000. They are being built under the favorable conditions of the Merchant Marine Act of 1928, and the company has a mail carrying contract between the ports of New York and Puerto Colombia.

Second Naval Airship Authorized.—The Navy Department has approved a contract for the building of the ZRS-5, sister ship of the giant airship Akron, from the Goodyear Zeppelin Corporation, delivery time to be about 15 months. The ZRA-5 is to cost about $2,450,000, which is about half as much as her sister ship. The difference was provided to safeguard the Goodyear-Zeppelin Corporation's tremendous plant investment in the event that the second airship should not be ordered by the Navy Department.

Calls for Bids for Construction of New Vessel.—Bids for the construction of a steel, twin-screw, lighthouse tender, for service in the waters of the Gulf of Mexico, have been called for by the Lighthouse Service of the Department of Commerce, and were opened on November 24.

This vessel is to be 93 feet long, of 23 foot beam, and will draw about 5 feet of water. It will be propelled by two diesel engines of about 55 shaft horsepower each. The Myrtle, as this new vessel is to be called, has been designed for buoy and beacon work in the inside waters of the Eighth Lighthouse district, which extends from the Suwannee River in Florida to the Texas-Mexican border.

To Recondition Fleet.—George G. Sharp, naval architect and marine engineer, 30 Church Street, New York, has been authorized by Moore & McCormack Company, Inc., 5 Broadway, New York, to prepare plans and specifications for the reconditioning of the 11 vessels of the American Scantic Line fleet. The work will consist of building additional passenger accommodations into the vessels, subject to the approval of the Shipping Board.

Dredge and Towboat for Engineers.—The United States Engineers Office, War Department, Pittsburgh, Pa., is reported to be planning the construction of the dredger to be 100 ft. long and with a bucket capacity of one cubic yard, and a river towboat.

Navy Yard Inventory.—After a recent inventory taken by Navy officers at the Mare Island Navy Yard on San Francisco Bay, the present value of the plant investment is placed at $34,107,000. The disbursement for wages and salaries during the fiscal year ending June 30, 1931, was $7,000,000, and for material issued nearly $18,500,000.

New construction now under way at the yard includes only work on the Light Cruiser San Francisco, which is scheduled for delivery in February, 1934.

Towboats and Barges for the Mississippi.—Eads Johnson, naval architect and engineer, 115 Broadway, New York, has completed plans for the construction of two diesel-powered shallow draft river towboats for the Louisiana-Texas Waterways Corp., Maritime Building, New Orleans, La. The towboats will be 100 ft. long, 24 ft. beam, 4 ft. draft, and powered by 400 horsepower diesel engines. It is reported that the construction work may be done by the Camulette Shipbuilding Co., Inc., Slidell, La. This Company plans to have built also ten steel barges 120 by 30 by 7 feet.

To Recondition Ferryboat. — The Canadian Pacific Railway, Victoria, British Columbia, will spend $30,000 rebuilding the steamship Princess Adelaide, tied up at Victoria for two years, according to a report from Victoria. She will be prepared for service out of Vancouver on the Powell River run, replacing the steamship Princess Royal, which is to be retired.

Reconditioning Contract Placed.—The Moore Dry Dock Co., Oakland, Calif., has been awarded contract for reconditioning of the schooner Zodiac for the San Francisco Bay Pilots at a cost of $16,000. The schooner was purchased on the Atlantic Coast and brought to San Francisco. The work will include reconstructing the cabin arrangements and enlarging the engine room. Auxiliary diesel propulsion plant has been ordered from the Atlas-Imperial Diesel Engine Co. of Oakland.

Coast Guard Cutter for Great Lakes.—The United States Coast Guard, Washington, D.C., opened bids October 30 for the construction of a single-screw, geared-turbine powered cutter (No. 55), for service on the Great Lakes. The vessel is to be 165 ft. long, 36 ft. molded beam, 21 ft. molded depth, 13 ft. draft, and of 1500 shaft horsepower.

First Diesel-Electric Tugboat for U. S. Navy.—The United States Navy will soon have its first diesel-electric tugboat. The Charleston Navy Yard at Boston, Mass., is now building a 100-ft. craft for harbor service on the Atlantic Coast, which will be equipped with this type of drive. It is expected to go in operation early next summer.

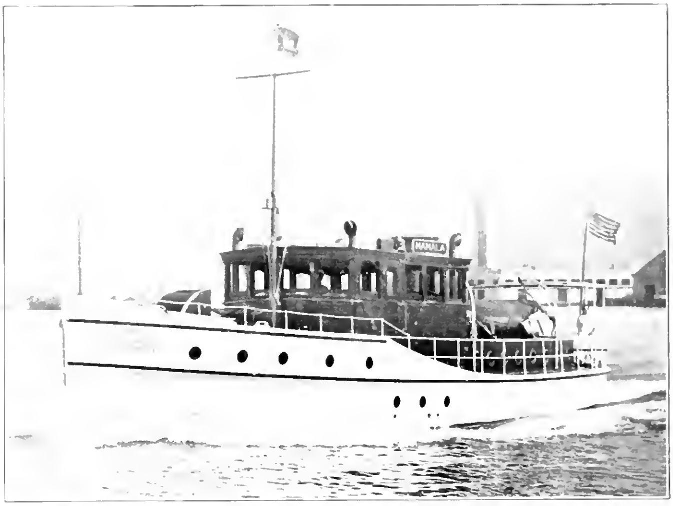
The power plant will consist of two McIntosh & Seymour 400-horsepower diesel engines driving two 260-kilowatt, 250-volt, 300-r.p.m., electric generators for propulsion power, and driving two 35-kilowatt, 125-volt, 300-r.p.m. electric generators for auxiliary power.

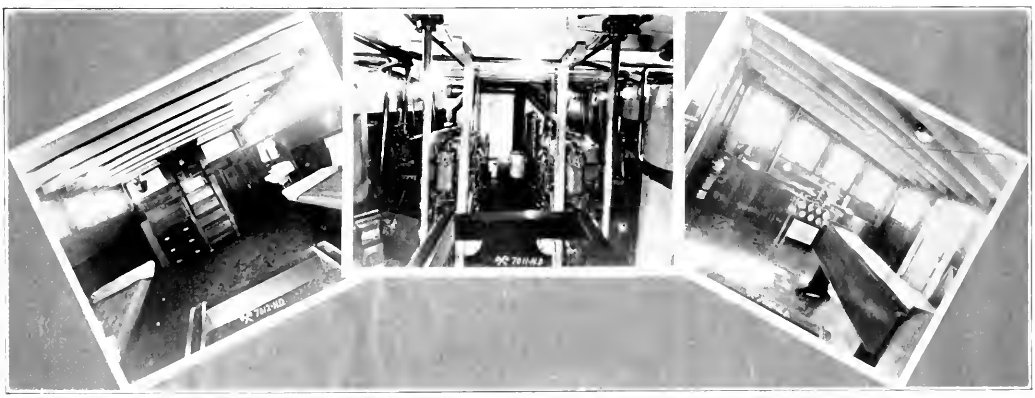
The single propeller will be driven by a 640-horsepower, 500-volt, 125-r.p.m., double-unit motor. The electric propulsion equipment will be manufactured by the General Electric Company. Control will be the variable-voltage type with stations in the pilot house and engine room. Auxiliaries aggregating approximately 20 horsepower will also be electrified.

United Fruit Launches Another Liner.—At noon on Saturday, November 4, the steamship Chiriqui, last in the series of three ships building for the United Fruit Company, will be launched with appropriate ceremony by the Newport News Shipbuilding and Dry Dock Company. The Talamanca and the Segovia were launched on August 15 from the same yards. Mrs. H.

SURVEY BOAT FOR HAWAII

We illustrate herewith a survey vessel, the Mamala, recently completed in Seattle by the Berg Shipbuilding Company for service in Hawaiian waters for the United States Engineers Office, Honolulu. The craft was designed by and constructed under the supervision of the Division Engineers Office, Pacific Division, San Francisco. The boat is especially designed for survey and inspection work in the Hawaiian Islands. She has dimensions 65 ft. length by 16 ft. beam, and 40 tons displacement. She is powered by twin 80-horsepower diesel engines, giving a speed of 10 knots. The vessel made the trip from Seattle to Honolulu in 12½ days under her own power and under the command of Captain C. T. Larsen. The cuts herewith show the Mamala in Honolulu Harbor—and some interior views of the engine room, pilot house, and cabin.





[illegible] wife of the Marine [illegible] of the United Fruit Company, was sponsor.

Work has been rushed on the [illegible] and she is scheduled to [illegible] New York on December [illegible] cruise through the Panama Canal to San Francisco, stopping at Havana and Kingston.

There are three additional ships building at the Fore River yards of the Bethlehem Ship Building Corporation at Quincy, Mass. The first, the Antigua, is to go down the ways on December 12 with state, municipal, and civic organizations of Massachusetts attending. The launching dates for the Quirigua and the Veragua have not been set, but will be some time after the first of the year. It is the intention of the United Fruit Company to use three of the new ships on the West Coast run between the Isthmus, Los Angeles and San Francisco; and three will be employed on the East Coast between New York and the Latin American ports.

Todd Shipyards Corporation Contributes to Unemployment Relief.—The Todd Shipyards Corporation has announced that the company and its Brooklyn subsidiaries, the Robins Dry Dock & Repair Co. and Todd Dry Dock Engineering & Repair Corp., along with their respective officers and employees, have voluntarily pledged support to the Brooklyn campaign to relieve the extraordinary unemployment situation. It is planned to contribute 2 per cent. of the weekly earnings for a period of twenty weeks.

Coast Guard Cutter Launched.—United Dry Docks, Inc., launched the United States Coast Guard cutter Cayuga at its Staten Island plant on October 7. The vessel has a length over all of 250 ft., beam 42 ft., depth 26 ft. 10 in., and is of 2000 tons displacement on 15 ft. draft.

She is powered by Westinghouse standard Coast Guard turbo-electric drive of the synchronous motor type, designed and constructed by the Westinghouse Electric & Manufacturing Co. Steam is supplied by two Babcock & Wilcox water-tube boilers, interdeck superheater, marine type, having a total evaporating surface of 6336 square feet and a total superheating surface of 696 square feet. Working pressure is 265 pounds per square inch, with 175 degrees of superheat. The boilers are equipped with Diamond soot blowers and Babcock & Wilcox feed water regulators, draft being furnished by Sturtevant multivane blowers.

The main turbine generator set drives a 3-phase, 60-cycle 2-pole generator through a solid coupling, with an output of 2600 kilowatts at 2600 revolutions per minute. The propulsion motor, rated 3200 horsepower, 3 phase, 60 cycle, is connected to a line shaft with Kingsbury thrust bearing. The propeller shaft is covered with Sandusky centrifugally cast bronze liner. The cutter is equipped with a Cramp 4-blade right-hand solid manganese bronze propeller. All motors for auxiliaries, such as the Warren pumps, are Westinghouse manufacture. The deck auxiliaries were supplied by the American Engineering Company.

Unusual view—U.S.C.G. cutter Cayuga being launched October 7, 1931, at the Staten Island Plant of the United Dry Docks, Inc. She is the first cutter built in the Port of New York.

The vessel has complete navigating equipment, including Sperry gyro-compass, two high intensity searchlights with pilot house control; Lietz compasses; Kearfott windows in the pilot house; Chas. Cory Corporation communication equipment; Thos. Walker & Sons, Ltd., Trident electric ship log; R.C.A. radio direction finder, with Sperry radio repeater. General Electric Company supplied the wireless apparatus. The Welin North sheath screw davits are used in connection with power launches equipped with Kermath gasoline engines.

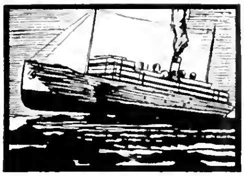
Nelseco Engine in New Dredge.—A new diesel-powered hydraulic dredge will be built for the McWilliams Dredging Company, of Chicago, Ill., and New Orleans, La. Jean M. Allen & Company, naval architect and consulting engineers, 75 East Wacker Drive, Chicago, are preparing the designs.

One Nelseco, Type 6 MI 53, 1200-horsepower, 300-revolutions per minute, engine will be installed, direct-connected, through a Nelseco-Vulcan hydraulic coupling to a 20 to 30-inch dredging pump. The exact size of the pump will depend upon the type of dredging to be performed, the 20-inch runner being used for discharging through one mile of discharge pipe, and a 30-inch runner being used for shorter distances and greater volumes.

A new and interesting feature of the installation is the use of the Vulcan Hydraulic coupling, the principle of which is similar to the ordinary water brake. This coupling will serve to transmit the engine power to the pump and, aside from eliminating vibration, will absorb severe shocks which may be created under operating conditions by a stoppage of the pump due to clogging. Slippage of this Vulcan coupling, according to the manufacturers, ranges from zero to 100 per cent. The mechanical efficiency loss is said to be about 3 per cent.

In addition to the 1200-horsepower Nelseco engine for the main pump drive, the McWilliams Dredging Company also purchased a 500-horsepower, 250-revolutions per minute Nelseco Type 6 MI 22 engine which will be direct-connected to a generator and service auxiliary power requirements, such as ladder, spud, winding, and other motors.

SHIPBUILDING—"PROGRESS OF CONSTRUCTION"—(Continued on Page 519)



Marine Insurance

Edited by James A. Quinby

Another Barge Held Unseaworthy

Appellate Court Condemns Improper Porthole Covering

THE case of California and Hawaiian Sugar Refining Corporation et al. vs. Rideout et al., recently decided by the Circuit Court of Appeals for the Ninth Circuit (San Francisco), in addition to affirming the well established principle that a carrying vessel must be seaworthy for her trade, even in the face of heavy weather, dealt with a rather unique insurance point.

The facts upon which the case arose were as follows: On or about May 25, 1929, the California and Hawaiian Sugar Refining Corporation requested the Bay Transport Company, their regular carriers, to transport 4500 bags of refined sugar from Crockett to San Francisco. As no Bay Transport vessel was available, the Bay Transport Company asked E. V. Rideout to carry the cargo with his tug and barge. The Bay Transport Company, however, issued bills of lading on the shipment, by which they agreed to carry the goods for the sugar company.

Overland

"I thought we'd passed the headland," said the mate.
"And then I heard the breakers, and I saw it was too late."

* * *

The navy ships at Honda won't maneuver any more,
The Harvard rusts her bones away on Arguello's shore.
The Colombia and the Munleon are knockin' at the door.
"Steady till we pass the point." . . . "Aye Aye," the helmsman said,
"Just hold her as she is, my lad. Full speed—full speed ahead."
"If you're lookin' for the skipper you can find him in his bed."

* * *

"I'm sorry," said the mate, "It was a navigatin' error.
We up and turned the corner and the corner wasn't there."

—J. A. Q.

The Rideout Barge No. 7, after picking up a small shipment of flour at Vallejo for the Sperry Flour Company, loaded the 4500 sacks of sugar at Crockett and proceeded on her way to San Francisco. As pointed out by the appellate court, a "succinct and probably accurate account" of the voyage is found in the written report prepared by Captain Beggs of the Rideout tug Elaine, which runs as follows:

"On leaving the California and Hawaiian Sugar Refining Co., Crockett, on our regular trip to San Francisco, 3:30 a.m., May 26, 1929, with Barges E.V.R. No. 4 and No. 7, the weather was calm and mild and no swell, all was well until a mile below Oleum Wharf, a fresh N.W. breeze came up and continued to increase until it reached a force of about 6 (Beaufort) with rising sea, we continued on our course. (Captain Beggs interpreted Beaufort 6 to be 36 miles an hour, but the Beaufort Scale itself, in the record as Libelants' Exhibit 7, gives '6' as being from 26 to 31 miles an hour).

The barges were making good weather, and in no apparent danger until abreast of Lt. By. No. 1, San Pablo Bay. We noticed Barge No. 7 taking a list to port. We immediately sounded the danger signal and ordered the crew of Barge No. 7 aboard Barge No. 4, which was in tow astern of Barge No. 7, this being at 5:45 a.m., and at 5:55 a.m. the barge gradually turned over, as we could not control the barge in the condition she was in, we cut her adrift at 6:03 a.m. At 6:10 a.m. we picked up Barge No. 4 and continued our voyage to Pier 19, San Francisco, where we notified the owner. Barge No. 7 contained 4500 bags sugar, consigned to California & Hawaiian Sugar Refining Co., San Francisco, in addition to other miscellaneous freight."

For the total loss of the cargo of the No. 7, the sugar company sued Rideout and the Bay Transport Company, and the Sperry Flour Company sued Rideout alone. The respondent relied generally upon the defense of heavy weather, and the Bay Transport Company interposed a special defense based upon an alleged waiver by the cargo insurer of his right of subrogation.

The Question of Seaworthiness

Although testimony was introduced at the trial in the District Court to show that the barge had an improperly covered porthole close to the water line, which might well have caused her to capsize in ordinary weather, the trial court held that the weather encountered, and not the defective condition of the barge, was the proximate cause of the loss. The lower court was undoubtedly influenced in his decision by the fact that there had been a sharp squall on the bay on the day of the accident, which had blown two other vessels ashore. Discussion of the insurance point in the lower court was thus unnecessary, and the libels were ordered dismissed.

Upon appeal, the Circuit Court of Appeals, on November 2, 1931, reversed the District Court and held the respondents liable for the loss. The appellate court pointed out that proof of due diligence to make a vessel seaworthy must be shown by a vessel owner before he can take advantage of the benefits conferred by the third section of the Harter Act, which section exempts a shipowner from loss caused—among other things—by dangers of the seas. The court then proceeds to find that the No. 7 was grossly unseaworthy as to the porthole covering. The following testimony of Andrade, the bargeman, and the comments upon it, are quoted from the opinion of the appellate court:

"I put a doubled-up sack against the hole. . . Then I put a board, that was what I call the plug, against the porthole . . I put wedges on . . up and down, two up and two down . . . between the plank and the sheathing."

"Asked why he used wedges instead of nails, Andrade replied that nails 'are liable to come out, and the wedges never come out.' Yet the barge foreman previously had testified that he 'could not tell how many times' he had tightened the 'plug' in the two and one-half years that he had been on the barge. He declared that the plug took 'a little over a year to get loose.'

As a matter of fact, the adequacy of such a 'plug' would appear, even to a landlubber, quite indefensible. Captain Joe W. Jory, a navigator of impressive seamanly qualifications, outlined the proper manner in which the porthole should have been closed:

Q. How do you think that hole should be closed?

A. It should have been planked from the outside and water-tight battans or canvas nailed over, and planked, or else the planking on this particular section renewed and that hole done away with.

From ancient times the men who have had to go down to the sea in ships have held themselves to high accountability for care in making their craft fit to cope with the capricious elements. Though, as we have seen, the shipowner's liability has been limited by statute, such limitation in his favor is to be strictly construed against him, if he fails to prove his own diligence in making the vessel seaworthy.

The good sailor is the careful sailor. If he is negligent in the respects set forth in the Harter Act in guarding the goods and the lives entrusted to his care, he or his employer must pay. It is the law of the sea."

The Insurance Point

As the vessel was held to be unseaworthy, it became necessary to decide the validity of respondent's second, or special, defense predicated upon the cargo underwriter's alleged waiver of his right of subrogation against the Bay Transport Company.

It appeared that the owners of the sugar had been paid for their loss by their cargo underwriter. In the cargo policy, a provision was inserted by which the insurer waived "all claims that it might have in law and equity against the Bay Transport Company for reimbursement of any losses paid to the assured." The waiver applied only to "shipments by steamers or barges the property of the Bay Transport Company."

The court rules against this special defense in the following language:

"The special defense of the Bay Transport Company may be disposed of readily. In the first place, the insurance policy containing the rider relied upon was excluded from the record, and no cross-appeal complaining of such exclusion has been filed by the appellee. Secondly, the rider itself specifically provides, as we have seen, that it shall apply to shipments by vessels that are 'the property of' the Bay Transport Company. To hold that the Rideout barge was the property of the Bay Transport Company, even so far as the California & Hawaiian Company's shipment, would not only be doing violence to both the legal and the popular acceptation of the term 'property,' but also would be ignoring the holding of the court and the statements of the appellees themselves.

As a matter of fact, found by the lower court and not excepted to by the appellee, the Bay Transport Company was a party to the contract of affreightment, and in turn employed Rideout to transport the shipment to San Francisco. The court also found that the barge was the property of Rideout, notwithstanding certain vague language used by the trial judge during the discussion of the insurance policy during the argument. The appellee is foreclosed from now denying this basic fact, and claiming ownership of the barge and the tug."

The appellant cargo interests were represented in the litigation by Derby, Sharp, Quinby & Tweedt. Messrs. Lillick, Olson & Graham appeared for E. V. Rideout, and Messrs. Gregory, Hunt and Melvin for the Bay Transport Company.

San Juan Case Closed

THE final act in one of the Pacific Coast's greatest dramas of the sea took place last month when United States Commissioner E. E. Williams handed down his report fixing the damages due passengers, members of the crew, and owners of cargo on the San Juan as a result of the loss of that vessel following her collision with the Standard Oil tanker S. C.T.Dodd on the night of August 29, 1929.

After numerous suits had been filed against both the vessels, and each vessel owner had filed a petition to limit liability, the S.C.T. Dodd was sold under the order of the Federal Court and realized $425,000. If limitation was available to the owners of the respective vessels, this sum represented the only source out of which claims could be settled, since the San Juan was a total loss. An amicable agreement was reached between the owners of the S.C.T. Dodd on the one hand and the claimants for cargo, death, and personal injury on the other hand, whereby the Standard Oil Company was allowed to withdraw $125,000 from the fund, leaving the remaining $300,000 to be distributed among the various claimants. Under the terms of this agreement, which was embodied in a decree by the Federal Court, it was admitted that both vessels were responsible for the collision and that each might technically have the benefit of limiting its liability.

Commissioner Williams' report allows a valuation of the claims in the amount of $320,697.69, approximately $100,000 of which represents the value of the San Juan's cargo which was insured largely by San Francisco underwriters.

The Original Dog-Barking Skipper

NOW that several of our best known Pacific steamers have passed to the limbo of departed ships by the time-honored method of hugging the coast line once too often, we are tempted to recall once more the words of Matt Peasley in Peter B. Kyne's original "Cappy Ricks." In a passage between Matt and Cappy's daughter, the former is discussing Ricks' requirement of two years as mate in steam as a prerequisite to command.

"He says," complains Matt, "I'd better learn the Pacific Coast like he knows his front lawn, or some foggy night I'll walk my vessel overland and the inspectors will set me down for a couple of years."

"Well, that sounds reasonable, Matt."

"Yes, I'll admit there's some justice in his contention, so I'm going to do it to please him, although I hate to have him think I'm a dog-barking navigator."

"Why, what's that?" Florry demanded.

"A dog-barking navigator is a coastwise blockhead that gets lost if he loses sight of land. He steers a course from headland to headland, and every little while on dark nights he stands in close and listens. Pretty soon he hears a dog barking alongshore. 'All right,' he says to the mate, 'We're off Point Montara. I know that Newfoundland dog's barking. He's the only one on the coast. Haul her off and hold her before the wind for four hours and then stand in again. When you pick up the bark of a foxhound you'll be off Pigeon Point.' "

Jurisdiction Denied in Foreign Seaman Injury Case

FOREIGN shipowners and their liability underwriters will be interested in a recent ruling of Judge Kerrigan of the Federal District Court in San Francisco in the case of Vroege vs. Rotterdamsche Lloyd, et al.

W. Vroege, a Dutch petty officer on the Dutch steamer Modjokerto, received injuries on the vessel while in San Francisco Bay, which injuries were claimed to have been due to the unseaworthiness of the vessel. Vroege filed a libel against the ship in the local federal court, which the shipowners moved to dismiss on the grounds that the controversy was between Dutch subjects, that the ship's articles contained a provision incorporating the Dutch "High Seas Accident Law," and that both libelant and ship had returned to Holland.

The Hon. H. A. van C. Torchiana, Consul General for the Netherlands, intervened in support of the ship's motion to dismiss the libel. The libelant, with considerable authority, contended that the court should retain jurisdiction on the ground that the accident happened in American waters, and that such an accident is governed by the lex loci delicti.

Judge Kerrigan granted the motion to dismiss, thus supporting the contention of the shipowner and the Consul General. The decision is similar to an earlier ruling by Judge Thacher in Ulric vs. North German Lloyd, 1929 A.M.C. 109.

Insurance Class Opens Term

THE Marine Insurance Study Class, sponsored by the Association of Marine Underwriters of San Francisco, began its eleventh term on the evening of Monday, October 19, under most auspicious circumstances. The large and representative group of marine underwriters, shipping men, and admiralty attorneys were favored by an address on the present trend of limitation proceedings by Carroll Single, well known admiralty attorney of San Francisco.

Mr. Single, late of the firm of Single & Single of New York, delivered a well rounded talk, first outlining the provisions of the statute which enables a shipowner to limit his liability to the value of his ves-

sel and pending freight after an accident unless the owner has been personally guilty of fault or privity because of the damage. He then traced a brief history of the statute and similar enactments in other countries, pointing out that the purpose of such legislation was to encourage the ownership and operation of vessels, and that the limitation statute is purely paternalistic in nature.

Mr. Single then proceeded to describe certain cases applying the statute in the past ten years, with particular reference to the Vestris, the Linseed King, and the Suduffco decisions.

Freights, Charters, Sales

November 16, 1931

THE following steamers have been fixed with grain to the United Kingdom: Japanese steamer Hofuku Maru, Vancouver, B. C., to U.K. Cont., 22/-, October, Strauss & Co.; British motorship Innesmoor, British Columbia to U. K./ Cont., 23/-, October, Kerr, Gifford & Co.; British motorship Vinemoor, Vancouver, B.C., to U.K./ Cont., Bordeaux/Hamburg range, 23/6, December, L. Dreyfus & Co.; British steamer Madras City, Vancouver, B.C., to U.K./Cont., 24/-, November/December, Strauss & Co.; Norwegian motorship Hoeyanger, Vancouver, B.C., to U.K./ Cont., spot loading, Kerr, Gifford & Co.; Norwegian motorship John Bakke, British Columbia to U.K./ Cont., wheat and merchandise, November, Canadian Transport Co.; British steamer Swiftpool, Vancouver, B.C., to U.K./Cont., 24/-, December, L. Dreyfus & Co.; Japanese steamer Liverpool Maru, Vancouver, B.C., to U.K./Cont., 22/-, November; British steamer Orient City, Vancouver, B.C. to U.K./Cont., 24/3, November, Wm. H. Pim, Jr., Co.; Norwegian motorship Samuel Bakke, British Columbia and Puget Sound to U.K. Cont., wheat and merchandise, December, Canadian Transport Co.; British steamer Masunda, Vancouver, B.C., to London, December, Canadian American Shipping Co.

The following steamers have been fixed with grain to the Orient: Norwegian steamer Childar, British steamers City of Vancouver and City of Victoria, Columbia River to Shanghai, October, $2.85, W. L. Comyn & Sons; American steamer Everett, Puget Sound to Shanghai, October, W. L. Comyn & Sons; Danish motorship Lundby, Columbia River and Puget Sound to Shanghai, October/November, flour $3.25, W. L. Comyn & Sons; British motorship Santa Clara Valley, Columbia River to Shanghai (relet), November, W. L. Comyn & Sons; Norwegian steamer Somerville, Columbia River and Puget Sound to Shanghai, November, $2.85, W. L. Comyn & Sons; Norwegian motorships Borgestad, Brand, Danwood, and Nordfarer, Portland or Puget Sound to Shanghai, option up river ports, November, W. L. Comyn & Sons; three steamers, Vancouver, B.C., to Shanghai, December, (Canadian Currency) $3, Canadian Cooperative Wheat Producers Assn.; British motorship Cressington Court, British steamers Tilsington Court and Sinnington Court, Columbia River to Shanghai, wheat $2.85, flour $3.25, October/November, W. L. Comyn & Sons; Danish motorship Asia, Columbia River or Puget Sound to Shanghai, wheat $2.85, flour $3.25, December, W. L. Comyn & Sons; British motorship Larchbank, Columbia River or Puget Sound to Shanghai, wheat $2.85, flour $3.25, December, W. L. Comyn & Sons; British steamer Uffington Court, Vancouver, B.C., to Shanghai, December, Canadian American Shipping Company; a Court steamer, Columbia River or Puget Sound to Shanghai, wheat $2.85, flour $3.25, November/December, W. L. Comyn & Sons; British steamer Wellington Court, Columbia River or Puget Sound to Shanghai, wheat $2.85, flour $3.25, January, W. L. Comyn & Sons.

The Norwegian motorship Borgestad has been fixed with lumber from British Columbia to Port Pirie, November, by H. R. MacMillan Export Co.

The following time charters have been reported: Norwegian motorship Heina, 5 to 9 months, delivery Montreal, redelivery China and Japan or U.K., via North Pacific, 4/7½, Canadian Transport Co.; Swedish motorship Sveadrott, 1 trip, delivery Vancouver, B.C., redelivery China $1.45, October/November, Canadian American Shipping Co.; Norwegian motorship Nyhorn, 1 trip, delivery, San Francisco 7/6, option delivery Portland 7/7½, redelivery U.K. Cont., November, Canadian Transport Co.; Danish motorships Nordbo and Nordcap, 3 to 5 months, delivery Columbia River or Puget Sound, redelivery China or U. S., $1, November/December, W. L. Comyn & Sons.

The following sales have been reported: American steamer Humboldt, Los Angeles and San Francisco Navigation Co. to Cooper Iron Metal Co.; American steamer Cottoneva, South Redwood to C. W. Goodyear; American steamer Necanicum, A. F. Mahoney to C. W. Goodyear; British steamer Canadian Seigneur, Canadian National Steamships to Japanese parties.

PAGE BROS., Brokers

Marine Refrigeration

(Continued from Page 501)

7. Decking

The steel deck, after being thoroughly cleaned and dried, shall be given two coats of bituminous solution, as specified under "Preparation of Space," and flooded with bituminous enamel*, into which lay ....-inch corkboards dipped in the same material. Then lay a second course, after flooding the first course, the joints of the courses being broken. Over the second course of cork and enamel and at the base of bulkheads, lay 8 pound lead flashing, six inches over the cork and six inches against the bulkhead with wiped joints. The flashing shall be secured to the bulkhead with galvanized tacks closely spaced, and the upper edge shall be imbedded in white lead putty.

(b) Where interior surfaces are covered with bituminous filling, the same shall bond with the floor covering to make a monolithic surface over the whole room.

(c) The cork deck covering shall then be covered with a mastic floor covering*, not less than 1½ inches thick, and so laid as to drain all surfaces to the scupper drains.

(*The flooding enamel of the cork flooring shall have a boiling point equal to, or above, the temperature of the mastic flooring as laid, to prevent blistering when applied.)

8. Doors

All doors shall be 4 feet by ... feet clear opening and have not less than .. inches of insulation. The hardware, spring hinges, latches, hasps shall be of .... manufacture, or equal. The tread and the jambs of the doors shall be sheathed with 1/8-inch galvanized sheet iron for protection from cargo handling. The doors shall be double-gasketed.

9. Hatches

Hatches (if any) shall be made of heavy construction, with not less than .... thickness of corkboard. They shall be of portable size, the joints to be metal-sheathed and gasketed.

10. Drains

Each compartment shall have ... drains of ... inches and fitted with galvanized water-sealed scupper fittings. They shall be designed to facilitate quick cleaning, and the drain piping shall have clean-out fittings.

11. Gratings

All floor gratings shall be of portable size, with 2-inch x 3-inch bearers, laid at right angles to the coil walls. The slats shall be 1-inch x 2½-inch finished size, with 1¼-inch opening between.

12. Coil Baffles

The coils shall be enclosed behind a solid baffle, constructed of two layers of 7/8-inch tongue and groove pine, with two layers of paper between. They shall clear the deck and deck-head by ten inches and the coils by not less than two inches. They shall be made of portable-sized sections and will enclose the coils at the ends, except at corners formed by two coil-covered walls.

13. Meat Rails

Meat rails shall be hung in rooms Nos. .... and shall be of ½-inch x 2-inch flat bar, suspended from 2- x 2- x ¼-inch angle bar hangers, and galvanized after machining. The hangers shall have two bolts in every second beam, with wood insulators between the beam and the hanger. The rails shall be carried close to the bulkheads or baffles at their ends. The rails shall be hung on 20-inch thwartship centers and shall clear the deck-head by six inches.

14. Painting

(a) All interior surfaces shall have two coats of orange shellac after all stains shall have been sanded off. Exterior surfaces will be painted with owner's standard hold colors.

(a_1) All interior surfaces shall have one coat of shellac and one coat of aluminum paint with bituminous vehicle.

(b) Gratings and room faces of baffles shall be painted as above, the coil faces to be water-proofed.

15. Electric Lighting

All spaces shall be adequately lighted with ...... vapor-tight fixtures in each room. The cables shall be run in conduit (or of lead and armoured cable) and the water-tight switches and tell-tale lights shall be installed at the door outside of the chamber.

Ships Lighting

(Continued from Page 495)

held candles and delicate oil flames will now hold the very modern Mazda lamp. Let it be stated, nevertheless, that these lamps are different—far brighter—than old sconces, and deserve new and modern housings. A drawback is that sometimes period lighting, in spite of all its delicate charm and beauty, does not produce sufficient illumination. Again we can resort to lighting from concealed sources.

A very fine ship-lighting effect can be obtained by concealing light sources in urns, oversize flower pots and pedestals. If the ceiling and upper sidewalls are painted in colors such as white or cream, which have high reflecting factors, and the lamps used are of sufficiently high intensity and equipped with the proper reflectors, the light will be directed upward to flood the ceiling and then be reflected downward to fill the room with a soft glow of light. Such concealed lighting can be used with equal propriety in period rooms or in the modern style of room.

Cove Lighting Growing in Popularity

Cove lighting or lighting from concealed sources is rapidly becoming one of the most popular forms. It can be used by itself or as a supplement to other forms of lighting. It satisfies practically all the requirements except of cheapest initial installation. It is fixtureless, takes very little space, and makes glare practically impossible. It can be made suitable for almost any room and is used today in dining rooms, grand salons, and in de luxe suites, though it really shows to best advantage in the larger public rooms with high ceilings.

Innovations in Ship Lighting

A huge electric sign on the Europa, housing 100 40-watt lamps in each letter, can be seen on the ocean at a distance of five miles. A recently completed flood-lighting installation on the steamship Conde Grand brings forth two illuminated funnels, standing out majestically in the surrounding darkness of the night.

The ship is a fertile field for originality, initiative, and daring in the lighting effects. Here men have conceived and constructed luminous glass floors and have arranged lamps in windows to imitate and supplement sunlight itself. The architect has a few restrictions, and in the larger liners has done some remarkable things.

Progress of Construction

The following Report Covers the Shipbuilding Work in Progress at the Leading Shipyards of the United States as of November 1, 1931

Pacific Coast

BERG SHIPBUILDING CO.,
28th Ave., N.W., Seattle, Wn.

Not named, wooden hull, passenger and cargo motorship for U. S. Dept. of Interior, Bureau of Indian Affairs, Polson Bldg., Seattle, Wn., for Alaska Service; 210 L.B.P.; 41 molded beam; 21'6" molded depth; 16 loaded draft; 1200 B H.P. McIntosh & Seymour diesel eng.; 14 knots speed.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Columbine, hull 180, lighthouse tender for U. S. Department of Commerce, Lighthouse Bureau; 112'2" L.B.P.; 25 molded beam; 9½ naut. mi. speed; diesel-electric engs.; keel 4/23/31; launched 7/27/31; **delivered 10/23/31.**

San Diego, hull 181, steel screw, double-end, diesel-electric, automobile ferry for San Diego-Coronado Ferry Co.; 204'11" L.O.A.; 43'6" breadth at deck; Atlas-Imperial diesel; keel 5/28/31; launched 9/14/31; **delivered 11/6/31.**

U. S. NAVY YARD,
Bremerton, Wash.

Astoria, light cruiser CL-34 for United States Navy; 10,000 tons displacement; keel 9/1/30; deliver 4/1/33 est.

Worden, D.D. 352, torpedo boat destroyer for U. S. Navy; 340 ft. long, 35 knots speed.

U. S. NAVY YARD,
Mare Island, Calif.

San Francisco, light cruiser CL-38 for United States Navy; 10,000 tons displacement; keel 9/1/31.

Pacific Coast Repairs

BETHLEHEM SHIPBUILDING CORP., LTD.,
Union Plant

Drydock, clean, paint, misc. repairs: s.s. Cathwood, str. Santa Maria, str. Topila, str. D. G. Scofield, str. President Grant, s.s. El Segundo, s.s. Sierra, s.s. Suriname, s.s. President Lincoln, s.s. Wilhelmina, s.s. Point Palmas, s.s. Richmond, U.S. cutter Inspector, whaling steamers Clemente, Columbus, m.s. Capella, Healy Tibbitts Barge No. 4. Line crankshaft and place in vessel: launch Progress. Repairs to M E. throttle: Gothic Star. Make and install one forged steel tailshaft: s.s. Tamaha. Caulked rivets and seams: s.s. Margaret Dollar. Drydock, misc. repairs: barge Lahaina. Cement propeller blades: s.s. Tahchee. Install 12 soot blowers: s.s. San Mateo. One propeller shaft: ferry Ramon. Furnish and install one new piston rod L.P. main engine: s.s. Charcas. Misc. repairs: s.s. Dixie Arrow, Satanta, Nora, Tecumseh. Saramacca, San Mateo, President Polk. La Perla, Makura, Limon m.s. Cubore, Otokia, Lio, launches Patriotic, Linde, Cleopatra, Success No. 3, Standard, Daiho, U.S.A.T. Ludington.

GENERAL ENGINEERING & DRY DOCK CO.,
Oakland, Calif.

Purchasing Agent: A. Wanner.

Drydock, clean, paint: oil yacht Zaca (also engine and deck repairs), U. S. Engineers dredge San Joaquin (also general repairs), stmr. Makawao (also engine and deck repairs), U.S. harbor boat Gen'l Frank M. Coxe (also engine and deck repairs), str. Chilkat (also minor repairs), gas tanker Delta Standard (also deck repairs), str. Emidio (also engine and deck repairs) Machine shop work: str. Voca. Drydock and misc. repairs: dredge San Pedro. Boiler and deck repairs: ferry City of Sacramento. Drydock, engine and deck repairs: U. S. patrol boat 256. Misc. repairs: str. Jane Christenson.

THE MOORE DRY DOCK COMPANY,
Oakland, Calif.

Drydocked, cleaned, painted: m.s. Patterson, str. Trinidad (also unshipped rudder, renewed same, renewed section of keel and stern and rudder post), str. Tiverton (also misc. repairs), ferry Hayward (also misc. repairs), str. Golden Peak (also caulked misc. rivets in shell, repaired rudder, overhauled sea valves), str. Willpolo (also ranged anchor chains and repaired same, caulked misc. rivets and seams in shell), str. Monoa (also ranged anchor chains, caulked misc. rivets and seams, drew tail shaft, overhauled sea valves), m.s. Benicia (also caulked and welded misc. rivets), str. Missoula (also overhauled double bottom tanks, drew tail shaft, and other misc. repairs), str. Texan (also misc. repairs), str. Willfaro (also caulked misc rivets, overhauled sea valves, misc. repairs), str. Tulsagas (also ranged anchor chains and other misc. repairs), str. Absaroka (also drew tail shaft for examination, caulked and welded misc. rivets in shell and other repairs). Drydocked for survey: tug Penquin, West. Pacific Barge No. 1. Drydocked for installation of structural steel for spuds: Siems Helmer Co. barge.

PRINCE RUPERT DRY DOCK & SHIPYARD
Prince Rupert, B.C.

Drydocked, cleaned, painted, annual overhaul: C.G.s. Newington. Drydocked, cleaned, rudder repairs: tug Master. Drydock, cleaned, painted: tug Salvage Princess. Docked, cleaned, painted, misc. hull and machinery repairs: 5 fishing boats. Misc. hull and machinery repairs: 13 fishing boats.

TODD DRY DOCKS, INC.,
Harbor Island, Seattle, Wn.

Drydocked, cleaned, painted, misc. repairs: str. Condor, str. President Jefferson, President Taft. Drydocked and misc. repairs: str. Point Gorda. Misc. repairs: str. Ballard, Commander, Everett, Hegira, Petroleum II.

U. S. NAVY YARD,
Bremerton, Wn.

Misc repairs and docking: New York West Virginia, Dorsey, Litchfield. Misc. repairs incidental to operation as district craft: Mahopac, Tatnuck, Swallow, Challenge, Pawtucket, Sotoyomo.

Atlantic, Lakes, Rivers

BATH IRON WORKS
Bath, Maine

Aletes, hull 138, steel yacht, owner not named; 190 L.O.A. 154 L.W.L.; 26 beam; two 800 B.H.P. Bessemer diesels; keel 6/10/30; launched 4/10/31; deliver 1/15/32 est.

Hull 147, twin screw, steel patrol boat for U.S. Coast Guard; 165 ft. long; diesel eng.; keel 5/1/31; launch 11/9/31; deliver 11/29/31 est.

Hull 148, same as above; keel 5/6/31; launch 11/28/31 est.; deliver 12/24/31 est.

Hull 149, same as above; keel 5/9/31; deliver 1/18/32 est.

Hull 150, same as above; keel 5/14/31; deliver 2/12/32 est.

Hull 151, same as above; keel 5/20/31; deliver 3/9/32 est.

Hull 152, same as above; keel 7/22/31; deliver 4/3/32 est.

Hull 153, same as above: **keel 9/15/31;** deliver 4/28/32 est.

Dewey, U. S. Torpedo Boat Destroyer No. 349 for U. S. Navy; 340 ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORPORATION, FORE RIVER PLANT,
Quincy, Mass.

Northampton, light cruiser CL-26, for United States Navy; 10,000 tons displacement; launch Sept. 7/29 est.

Portland, light cruiser CL-33, same as above; deliver 8/15/32 est.

Mariposa, hull 1440, steel express passenger steamer for Oceanic Steamship Co. (Matson Nav. Co.) San Francisco; 632' length; 79' beam; 22,000 gr. tons; 20½ knots; 3 steam turbines; 22,000 S.H.P.; 12 W. T. boilers; launched 7/18/31.

Monterey, hull 1441, sister to above; launched 10/12/31.

Lurline, hull 1447, sister to above.

Not named, ferryboat for City of Boston; 172 ft. long; 172'4" over guards; 40'8" beam; 16'10" depth; 2 comp. steam eng.; Scotch boilers; 11' dia. x 13'; 150 lbs. working pressure.

Antigua, hull 1444, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; 7200 gr. tons turbo-electric propulsion; 10,500 I.H.P.; launch 10/25/31 est.

Quirigua, hull 1445, sister to above; launch 11/14/31 est.

Veragua, hull 1446, sister to above; launch 12/12/31 est.

[illegible] hull [illegible] No. 348 [illegible] S. Navy; 34[illegible] ft. long; 35 knots speed.

BETHLEHEM SHIPBUILDING CORP., LTD.,
Baltimore, Md.

Hull 4288, coastwise diesel oil tanker for Standard Transportation Co., 262x45x15 [illegible] McIntosh & Seymour diesels.

COLLINGWOOD SHIPYARDS, LTD.,
Collingwood, Ontario

Purchasing Agent: E. Podmore.

Not named, hull 87, hydrographic survey vessel for Canadian Government; 214 L.B.P.; 36 beam; 12 mi. loaded speed; twin screw, TE engs.; 1200 I.H.P.; 2 Scotch boilers, 13'6" diam.; keel 8/12/31.

Repairs: Docked to make temporary repairs to bottom damage, S.S. Donald Stewart.

DEFOE BOAT & MOTOR WORKS
Bay City, Michigan

Purchasing Agent: W. E. Whitehouse.

Not named, hull 149, cutter for U. S. Coast Guard; 165 L.B.P.; 36 beam; 13 loaded draft; 15 M.P.H.; 960 D.W.T.; geared turbine, 1500 S.H.P.; 2 W-T boilers; keel 12/15/31 est.; launch 4/15/32 est.; deliver 10/1/32 est.

DRAVO CONTRACTING COMPANY,
Pittsburgh, Pa., and Wilmington, Del.

Hulls 995-997 incl., three diesel sternwheel towboats for stock; **2 delivered.**

Hulls 1086 to 1115, incl., 30 hopper-type steel coal barges; for stock; 175 x 26 x 11 ft.; **29 delivered.**

Hulls 1129-1130 incl., two 32-inch steel suction dredges for U.S. Engineers Office, Memphis, Tenn.; 214x46x9'5"; two TE steam engs.; 1200 H.P.

Hull 1134, one 24-in. steel suction dredge for U. S. Eng. Office, St. Louis, Mo.

Hulls 1135-1136, two steel side dump scows for Contracting Dept., 115x28x7'6".

Hull 1137, one steel deck barge for U. S. Engineers, Office, Norfolk Va.; 100x30x8'6".

DUBUQUE BOAT & BOILER WORKS,
Dubuque, Iowa

Self-propelled, 16-inch suction, pipe-line dredge for U. S. Engineers Office, Vicksburg, Miss.; deliver May/32 est.

FEDERAL SHIPBUILDING & DRY DOCK COMPANY
Kearny, N. J.

Purchasing Agent, R. S. Page.

Santa Rosa, hull 121, combination passenger and freight steamer for Panama Mail Steamship Company, San Francisco (W. R. Grace & Co., subsidiary), 484 L.B.P.; 72 beam; 26'1" loaded draft; 18.5 knots loaded speed; 7150 D.W.T.; 12,600 I.H.P. turbines; 2 boilers; keel 6/22/'31; launch Feb./32 est.

Santa Paula, hull 122, sister to above; keel 8/4/31; launch Apr./32 est.

Santa Lucia, hull 123, sister to above for Grace Steamship Co., New York; keel 9/28/31; launch June/32 est.

Santa Elena, hull 124, sister to above; keel Feb./32 est.

HOWARD SHIPYARDS & DOCK COMPANY,
Jeffersonville, Ind.

Purchasing Agent, W. H. Dickey.

Mark Twain, hull 1691, river towboat for Inland Waterways Corp., Washington, D.C.; 196 ft. L.O.A.; 42 molded beam; 6 molded depth; 1000 H.P. comp. condensing eng.; keel 4/28/31; launched 8/29/31, deliver 12/21/31 est.

MARIETTA MANUFACTURING CO.,
Point Pleasant, W. Va.

Purchasing Agent: S. C. Wilhelm.

Five cargo barges for Inland Waterways Corp.; 230 x 45 x 11 ft.; **3 delivered.**

Captain Meriwether Lewis, dredge, for U. S. Engineers Office, Washington, D.C.; 260 x 50 x 8'6".

Captain William Clark, same as above.

One steel derrick boat hull for Federal Steel Co.; 28 x 65 x 5'9".

MIDLAND BARGE COMPANY,
Midland, Penn.

Eight floating steel caissons for Foundation Co.

NASHVILLE BRIDGE COMPANY,
Nashville, Tenn.

Purchasing Agent, R. L. Baldwin.

Hull 260, dredge for stock; 140 x 36 x 9'; keel 11/16/'31 est. launch 1/11/32 est.

NEWPORT NEWS SHIPBUILDING & DRYDOCK COMPANY
Newport News, Va.

Purchasing Agent: Jas. Plummer, 90 Broad Street, New York City.

Talamanca, hull 344, passenger and refrigerated cargo vessel for United Mail Steamship Co.; 446 L.O.A.; 60 beam; 34 depth; 24 loaded draft; 17½ knots speed; 10,940 tons displacement; turbo-electric propulsion; 10,500 I.H.P.; keel 2/2/31; launched 8/15/31; deliver 12/31 est.

Segovia, hull 345, sister to above; keel 3/9/31; launched 8/15/31; delivery 1/32 est.

Chiriqui, hull 346, sister to above; keel 4/27/31; **launched 11/14/31;** deliver 7/32 est.

Not named, hull 347, passenger and freight vessel for Colombian Mail Steamship Corp.; New York; 404'3" L.O.A.; 57'6" beam; 31'6" depth; 16 knots speed; steam turbine drive; 5200 gr. tons; keel 2/32 est.; launch 8/32 est.; deliver 12/1/32 est.

Not named, hull 348, sister to above; keel 4/32 est.; launch 7/32 est.; deliver 12/15/32 est.

Saint John, hull 350, passenger and freight vessel for Eastern Steamship Lines, India Wharf, Boston, Mass.; 402'9" L.O.A.; 60 beam; 29'9" depth; 20-22 knots; single reduction Newport News-Parsons geared turbines; Babcock & Wilcox boilers; keel 7/21/31; launch 1/32 est.; deliver 5/32 est.

Arcadia, hull 351, sister to above; keel 8/31/31; launch 2/32 est.; deliver 6/32 est.

Ranger, hull 353, Aircraft Carrier No. 4 for U. S. Navy Dept.; keel 9/26/'31; deliver Mar./34 est.

NEW YORK SHIPBUILDING CO.
Camden, N. J.

Purchasing Agent: J. W. Meeker.

Indianapolis, hull 399, light cruiser No. 35 for United States Navy; 10,000 tons displacement; keel Mar. 31/30.

Manhattan, hull 405, passenger and cargo vessel for United States Lines, New York; 666 L.B.P.; 86' beam; 32' loaded draft max.; 20 knots speed; 12,000 D.W.T.; geared turbines, 30,000 S.H.P.; 6 B. & W. boilers; keel 12/6/30; launch 12/5/31 est.; deliver 6/32 est.

Not named, hull 406, passenger and cargo vessel, same as above; keel 1/20/31.

Tuscaloosa, hull 407, Scout Cruiser No. 37 for U. S. Navy Department, Washington, D.C.; 578 L.B.P.; 60'1½" molded beam; 21'7" loaded draft; 10,000 tons displ.; geared turbines; 107,000 I.H.P.; 8 section express boilers; keel 9/3/31.

SPEDDEN SHIPBUILDING CO.,
Baltimore, Maryland

Purchasing Agent: W. J. Collison.

Not named, hull 271, tug for U. S. Public Health Service; 100 L.B.P.; 22 beam; 11 ft. loaded draft; 2 230-H.P. Fairbanks-Morse diesel engs.; Westinghouse generators; 400 H.P. motor; keel 8/1/31; launch 11/5/31 est.; deliver 4/1/32 est.

SUN SHIPBUILDING & DRY DOCK COMPANY,
Chester, Penn.

Purchasing Agent: H. W. Scott.

Not named, hull 133, single-screw, diesel tanker for Motor Tankship Corp.; 13,400 D.W.T.; keel 9/17/'30; deliver 12/15/31 est.

Not named, hull 134, sister to above.

Not named, hull 135, sister to above.

Not named, hull 136, sister to above.

UNITED DRY DOCKS, Inc.
Mariner's Harbor, N.Y.

Purchasing Agent: R. C. Miller.

Cayuga, hull 797, coast guard cutter for U.S. Coast Guard Service; 250 L.O.A.; 42 beam; 16 mi. loaded speed; turbo-electric.; 3200 I.H.P.; 2 W. T. boilers; keel 2/9/'31; launched 10/7/31; deliver 2/1/32 est.

Knickerbocker, hull 798, ferryboat for New York Dept. of Plant and Structure; 267 L.O.A.; 66 beam; 13'9" loaded draft; 12 knots speed; double comp. engs.; 4000 I.H.P.; 4 W.T. boilers; keel 2/9/31; launched 9/1/31, delivered **10/31/31.**

Trade Notes

Oil Purifiers for Eastern Steamships.—Each of the two new Eastern Steamship Company ships now under construction at Newport News Shipbuilding & Dry Dock Co. will be equipped with a Sharples Centrifugal Oil Purifier to purify the turbine lubricating oil.

A Lumber Disinfectant.—A new disinfectant developed by E. I. du Pont de Nemours & Company and now used in more than a hundred lumber mills has been proved efficient in preventing sap stain or "blue stain" and mold in pine, sap gum, black gum, yellow poplar, magnolia, and other hardwoods. The lumber is treated with a cold solution by either dipping or spraying. Lumber treated by the new method retains its bright clean appearance.

Cutless Rubber Bearings.—Two dredges operated by the Arundel Corp. of Baltimore, recently were equipped with Goodrich cutless bearings manufactured by The B. F. Goodrich Rubber Company, Akron, Ohio.

The dredge Hallandale bearing fits a 7-inch shaft, and the bearing on the dredge General is 8-7/8 inches in diameter.

Trade Notes

New Floor Grating.—Robert H. Irons, president of the Central Iron and Steel Company, Harrisburg, Pennsylvania, announced that his company has developed and placed on the market an improvement over the ordinary fabricated floor grating, designating it their Slotted Floor Plate.

The new Slotted Floor Plate is nonskid and proof against slipping in any direction. Because of its basic design, it requires no deep recess or rabbet in which to set. It can be furnished in almost any gauge and in sizes up to 72 by 240 inches. Because of these large sizes, complicated and expensive supporting structures are not required with the Central Slotted Floor Plate.

In addition to being absolutely nonskid, this new plate has all the desirable characteristics of the best in gratings. It allows free ventilation, free drainage, passage of light, and reduced weight. These qualities obviously commend its use for ships' engine rooms, ships' boiler rooms, and for many applications in shipyards, on dry docks, outfitting docks, and marine terminals.

New Service to Mexico. — The Mexican Steamship Line will operate the steamship Guerrero between the ports of San Francisco and Los Angeles and the Mexican ports of Ensenada, San Jose del Cabo, Mazatlan, Acapulco, and Port Angel. The vessel has been purchased by L. P. Harrison of the agency firm of C. G. Krueger Co., Inc., of Los Angeles. Joseph Oropesa, with offices at Pier 25, will be the San Francisco manager.

School of Trade.—Golden Gate College, operated by the Y.M.C.A. at 220 Golden Gate Avenue, San Francisco, offers evening courses for men employed in **Freight Traffic.** The course started November 16 and covers Tariffs and Rates, Transportation Law, and Industrial Traffic, with a number of well qualified lecturers.

Elected to Executive Committee.—At the meeting of the Board of Directors of the Westinghouse Electric and Manufacturing Company held October 28, W. L. Mellon was elected a member of the Executive Committee to succeed the late Harrison Nesbit.

Trade Notes

American - Hawaiian Releases Sound Film.—Highly gratified at the success of its two-year campaign of using motion pictures to show shippers and consignees how cargo is handled from receipt to discharge, the American-Hawaiian Steamship Company, largest and oldest of the intercoastal carriers, has just announced the completion of a new talking motion picture, "Intercoastal Cargo." Hitherto, the company's pictures have been silent presentations, but "Intercoastal Cargo" is a sound picture with musical accompaniment.

Besides showing many interesting details of cargo handling, including the loading of a heavy-lift weighing 70,000 pounds, the new film incorporates views of New York harbor and skyline; Philadelphia Harbor; Boston Harbor and the famous Boston Fish Pier; close-ups of the old fighting frigate Constitution; Bunker Hill Monument; Old North Church Steeple of Paul Revere fame; numerous shots of the Panama Canal, including locks in operation, Gatun Lake and Dam, and the electric "mules" that pull the ships through; and a thrilling life boat drill at sea.

The new film will be shown free of charge to any interested organization or group, and bookings will be made by any company agent or representative.

New Westinghouse Advertising Manager.—Ralph Leavenworth has been appointed general advertising manager of the Westinghouse Electric and Manufacturing Company, according to an announcement by J. S. Tritle, vice-president and general manager. He will have charge of all advertising and publicity activities of the company, including the advertising division of the merchandising department, now centered in Mansfield, Ohio.

New Director of Manufacturing.—A. W. Thompson, who for the past five years has been Pacific Coast manager in charge of sales for Fairbanks, Morse & Co., has been appointed vice-president in charge of manufacturing.

That Mr. Thompson is exceptionally well qualified for the position is evident from his past experience. He was graduated with an engineering degree from the Rensselaer Polytechnic Institute

A. W. Thompson, vice-president in charge of manufacturing, Fairbanks, Morse & Co.

in 1907. In 1910 he made a connection with the General Electric Co. and remained there for ten years, during which time he was in charge of the design and development of the Erie Works of that company. In 1920 Mr. Thompson joined the Fairbanks-Morse organization as general manager of the Indianapolis plant, and in 1926 he was transferred to San Francisco as Pacific Coast Manager in charge of sales. In 1928 he was made a vice-president.

Tuna Bait Pumps.—Byron Jackson horizontal centrifugal pumps are coming into great favor as circulators for the fresh bait tanks on the fleets of new tuna "clipper" boats operating out of southern California ports. These pumps are arranged either for electric motor or diesel engine drive.

Among the vessels equipped with Byron Jackson pumps for this service is the Magellan, a 102-foot "billet" headed tuna fisher. She has two 8 by 20-inch V.A. bronze impeller monel metal shaft pumps with 1600 gallons per minute capacity at 500 revolutions per minute, connected through flexible coupling to the after end of a diesel engine which drives also a generator at its forward end. With these pumps there is always a positive head on the stuffing box which prevents any air from getting into the pump, a very desirable feature for bait pumps.

The new 117-foot Europa has two 6-inch V.A. pumps, each driven by a 7½-horsepower Westinghouse motor. The Flying Cloud has two 8-inch pumps, and the Trojan has two 8-inch pumps.

Improved Oil Burners. — A new catalog has just been published by **Enterprise Oil Burner Co.**, featuring a number of improved types of oil burners. The catalog contains 32 pages, presenting complete illustrations and details of the burners, with specifications and data on fuel consumption and vital heating statistics of interest to those using or specifying burners. It includes burners for application in power plants, where boilers are used, all types of industrial buildings, office buildings, homes, and for marine service. The catalog includes description of a new small oil burner known as AAA, adaptable to all types of heating units requiring a limited amount of combustion. A number of accessories manufactured by the firm are also included. Copies of the catalog may be procured by addressing the company, 2902 19th Street, San Francisco, or this magazine.

Manufacturing Pumps. — The Victor Welding Equipment Co., 844 Folsom Street, San Francisco, is now engaged in the manufacture of Kimballectric pumps. The Kimbell-Krogh Pump Co. was recently taken over by the Victor company in a merger.

Consulting Marine Engineer.—Announcement has been received that Arthur M. Tode has established offices at 17 Battery Place, New York, Suite 1011, and will carry on the work of consulting marine engineer. Mr. Tode has been some years with the engineering department of The Texas Company as diesel engineer. He has been actively interested in Safety Engineering; and as General Chairman of the Marine Section of the National Safety Council has done very good work in the promoting of safety work in the operation of merchant vessels. We wish Arthur Tode the greatest success in his work as consulting marine engineer.

New Offices.—The Mundet Cork Corporation has moved its New York office from 461 Eighth Avenue to new and larger quarters at 450 Seventh Avenue, occupying the twenty-ninth floor of the Nelson Tower.

Pacific Marine Personals

AFLOAT AND ASHORE ~ BY PAUL FAULKNER

JAMES TYSON, Jr. has been named a vice president of the Nelson Steamship Company of San Francisco. He is a son of James Tyson, president of the company, and has been identified with the company at the San Francisco office for a number of years. He has been transferred to the Seattle office, located at Pier D.

The Matson Line management has announced that COMMODORE J. H. TRASK, who for nearly thirty years has been in command of the South Seas and Australian liner Sierra, would be given command of the company's new $8,000,000 liner Mariposa, which sails from New York January 16 on her maiden voyage.

Coincident with Commodore Trask's promotion, it was announced that CAPTAIN W. R. MEYER, hero of the Tahiti rescue in 1930, and for years master of the liner Ventura, would be given command of the company's second new liner, the Monterey.

Commodore Trask is in New York where he will familiarize himself with his new command. Captain Meyer is at the shipyard watching the construction of the new liners. He will come around from New York to the west coast as executive officer to Commodore Trask and will then return to New York to take command of the Monterey.

Captain Meyer distinguished himself on August 17, 1930, by speeding his ship across uncharted seas to the rescue of the foundering Tahiti, arriving just as the lifeboats had been lowered into the water and only a couple of hours before the Tahiti plunged beneath the waves.

Commodore Trask has been going to sea for more than half a century, and has sailed more than two and a half million miles between San Francisco and Sydney as commander of the Sierra.

The commodore will take the new Mariposa on her South Seas and Oriental Cruise, sailing from San Francisco February 2, 1932, and February 3 from Los Angeles Harbor. Ports of call will include Honolulu, Pago Pago, Suva, Auckland, Sydney, Port Moresby, Thursday Island, Macassar, Batavia, Singapore, Bangkok, Manila, Hongkong, Shanghai, Chinwangtao, Miyajima, Kobe, Yokohama, and home via Honolulu and Hilo.

Here's Chief Engineer J. T. Anderson of the Matson Navigation Company's passenger and freight liner Matsonia.

Roger D. Lapham returns to San Francisco, home port of the American-Hawaiian fleet, of which he is president. Mr. Lapham has been on an extended Eastern tour.

M. C. O'HEARN, vice president of the United Fruit Company, with supervision over the Pacific Division, paid a visit to San Francisco last month for conference with J. SCOTT RIDER, manager, Pacific Division, in relation to the new services that will be introduced with the arrival at San Francisco, January 16, 1932, of the Talamanca, first of the three new turbo electric passenger and cargo vessels now building for the United Mail Steamship Company at Newport News Shipbuilding & Drydock Company.

CAPTAIN ROBERT DOLLAR has been honored by the Marine Society of New York. This society elected him an honorary member at its October meeting. In notifying Captain Dollar of his election, CAPTAIN RALPH B. DRISKO, president of the Marine Society, stated . . . . "This honor has been conferred upon you in appreciation of your efforts in the field of American shipping. . . ."

The Marine Society was formed in 1769, its objects being the relief of distressed shipmasters and their widows and children, and the promotion of maritime knowledge. Its list of members contains the names of many famous American shipmasters, and it has included among its honorary members the names of George Washington, Alexander Hamilton, Robert R. Livingston, Charles Evans Hughes, Calvin Coolidge, and J. Barstow Smull. Captain Robert Richard Randall, the founder of Sailors' Snug Harbor, was a member of the Marine Society; and the president and first vice president of the Society are trustees of that institution. Sailors' Snug Harbor is, and always has been, according to Captain Drisko, self-supporting, and today is furnishing a home for nearly 900 aged seamen. Captain Randall's father, Captain Thomas Randall, was one of the founders of the Marine Society.

Official News *of the* PROPELLER CLUB *of* California

EXCELLENT attendance and programs of merit and widespread interest have been the result of the weekly Tuesday luncheon gatherings in the attractive California Room of the San Francisco Commercial Club. A range of timely topics have been presented by our various directors on rotating chairmanship days. The November meetings brought forth the variety and talent as follows:

November 3.—Presiding Officer: Captain G. T. January. Speaker: Dr. Arthur A. O'Neil, a member.

Dr. O'Neil has been connected with the shipping fraternity for many years and is one of its most loved and respected members. He was former surgeon of the ill-fated steamship Rio Janeiro. Dr. O'Neil recently returned from a vacation spent on the Farallon Islands and a cruise on the pilot boat, and related many interesting incidents.

November 10. — Presiding Officer: Herbert J. Anderson. Guest Speaker: "Professor" Max Horwinski.

On this occasion "Bert" provided a program that was not only a surprise but was both interesting and humorous. Many of the members had difficulty in suppressing their laughter until they realized that the widely heralded "professor" was not a professor at all, but just a regular fellow like the rest of us. It was indeed a treat to hear "professor" Max Horwinski, whose inimitable presentations in German character have delighted thousands.

November 17. — Presiding Officer: Stanley Allen. Speaker: Captain Emile Topp, a member.

Captain Topp is commander of the California Nautical School Ship California State, and he gave a very interesting talk in which he outlined the progress of the State Nautical School to date. The school is now operating with 120 young cadets at its base at California City, and hopes to have its first cruise on the steamship California State before long. Captain Topp and the School Ship Board are to be congratulated on the progress made.

We also had the pleasure of having with us on this occasion Chief Engineer Dwyer and Executive Officer Grossman of the Schoolship. Another honored guest was Captain Coburn of the freighter San Mateo, who recently won fame for his rescue of 240 people from the steamer Colombia, wrecked off the Coast of Lower California. Still another guest was Father Rockcliffe of Liverpool, graduate of the schoolship Conway, former shipmaster, and fine old gentleman.

Vocal selections by Miss Maria Vogel of the San Francisco Opera Company furnished a rare treat.

November 24. — Presiding Officer: Joseph F. Dolan, past president. Guest Speaker: M. J. Buckley.

One of the most educational and interesting talks of the current series was presented by Mr. Buckley, who, as freight traffic manager of the Dollar Steamship Lines, is one of the foremost authorities on world-wide trade conditions. Mr. Buckley gave us the amazing history of the development of trade with the Orient and pointed out that Asia holds a vast future trade for American Pacific ports.

Our good shipmates in the Bilge Club at San Pedro, through Pete Harding, have presented us with the ship's bell from the steamer Colombia. The bell is now being mounted in a teakwood base by Propeller Tom Forster, and a formal acceptance will take place in the near future. The bell will be tolled at all of our banquets in the future.

It was thoughtful of our friends in the Southland, and we appreciate the courtesy.

New Members: Frank H. Evers, American Bureau of Shipping; and David Miller, Lloyds Register of Shipping.

December 9th!
Our Third Annual Christmas Jinks and Banquet!

On Wednesday, December 9, the Third Annual Christmas Jinks and Banquet of the Propeller Club of California will be held at the Elks Club in San Francisco.

The entertainment committee is concocting an Athletic Carnival with comical and classical diversions thrown in that should delight all hands.

The committee announces that this year as, in the past, the Propeller Club will furnish entertainment for the inmates of the Marine Hospital at San Francisco at Christmas and in addition will provide Christmas presents for their less fortunate shipmates who are spending the holidays in the hospital. All moneys derived from the Christmas Jinks and Banquet will be used for this worthy cause.

Formerly the steamship owners financed the purchase of Christmas gifts for the boys in the Marine Hospital, but this year they have their hands full feeding many hundreds of idle seafaring men so the Propeller Club has taken over the entire matter of providing Christmas Cheer for the boys in the Marine Hospital.

JOHN W. CHAPMAN, who recently resigned from the Dimon Steamship Corporation, has been made a Vice-President in Charge of Intercoastal Cargo Operations with Grace Lines, Inc., with headquarters at Hanover Square, New York. This appointment is made in line with the company's policy to increase its freight business in connection with the new liners which are under construction and which will be delivered starting next year. These four vessels will be operated in a fast passenger and freight service between ports on the West Coast of the United States, Mexico Central America, and Panama and ports of South America on the Caribbean and Havana and New York. Mr. Chapman has had considerable experience in the intercoastal trade and has always been considered a very able man in the development of this business.

GUY E. BUCK remains freight traffic manager at San Francisco, specializing in the Latin American service. Mr. Buck recently returned to San Francisco from an extended trip to Central America, Havana, New York, and Chicago in the interests of his company.

HARRISON J. HART, of the Puget Sound Tug and Barge Company, was elected president of the Maritime Association of Seattle at its recent election. CAPTAIN LOUIS J. HALL, assistant manager of Alexander & Baldwin, was elected first vice-president; JOHN CARMODE, American Mail Line, was chosen secretary-treasurer.

H. L. STILLWELL, managing director of the Export Fibreboard Case Association, who recently returned from a five months business trip through England, Scotland, Wales, Ireland, France, and Germany, is optimistic on the future market for Pacific Coast food products in Western Europe.

Mr. Stillwell declares that present conditions have not changed the need of these peoples for such products as canned fruits, canned vegetables, and raisins in bulk or cartons. Such foods are going export to Western Europe in rapidly increasing quantities and will continue to be imported by that section of the world.

While on this trip, Mr. Stillwell

John W. Chapman, now vice-president in charge of Intercoastal cargo for the fast-growing Grace Lines.

established for the Export Fibreboard Case Association a traffic service office in London and engaged traffic service representatives in all the principal ports. These men will service cargoes and make valuable suggestions for the physical handling thereof. Every effort will be made to lower shipping costs and minimize damage claims. The E. F. C. A. service work is making definite improvements in cargo handling in and out of ships and in warehouses at home and abroad. Exports in fibreboard cases have shown great increase during this year.

Remarkable growth of Scovill affairs on the Pacific Coast is attributable largely to George D. Engle, sales manager for the West.

HUGH GALLAGHER, operating manager for the Matson Navigation Company, is back in action again after a lay-up of about a month as a result of a fall and serious injury to his left knee while inspecting the steamer Sierra on sailing day. Gallagher was given a hearty welcome when he appeared on the floor of the Merchants Exchange after his long absence.

CYRUS A. ANDERSON, San Francisco manager of The Anderson Mattoon Company, Ltd., has announced the appointment of his company as Pacific Coast agent for the Mississippi Valley Barge Line Company. This is the largest privately owned line in the country operating on the inland waterways, equipment including 50 barges at the present time, with the company planning on the construction of 40 additional barges. The firm operates river barges between the ports of New Orleans and St. Louis, also between New Orleans and Ohio river points, as far as Cincinnati.

FRED L. NASON, San Francisco manager for the Canadian Pacific Railway, reports that the company's beautiful new liner Empress of Britain is scheduled to call at the Pacific Coast ports next March on her first round-the-world cruise. This will be the largest commercial vessel ever to enter the Golden Gate —and as she is one of the finest passenger liners in the world, her advent is causing considerable interest in maritime circles.

The Insurance Institute of America at the closing session of its annual conference, which was recently held in New York City, elected CHARLES R. PAGE, vice-president Fireman's Fund group of fire and casualty companies, a member of the Board of Governors. The term of Mr. Page's office is for three years.

FREDERICK B. McBRIDE has been appointed Assistant Manager of the Atlantic Marine Department of the Fireman's Fund Group where he will be in charge of Ocean Marine underwriting for those companies. Mr. McBride who is widely and favorably known as an experienced and capable underwriter has been associated with the Insurance Company of North America in its New York Office.

SECRETARY H. P. BLANCHARD, after a term of 42 years of continuous service with the Fireman's Fund Insurance Company, is retiring from active duty on December 1, 1931, under the company's retirement plan.

Mr. Blanchard joined the Company in July, 1890, and, passing through the various underwriting desks at the Head Office, was made Special Agent, January, 1900, covering the Northcoast Counties in California. In 1903 he was transferred to Spokane, Washington, having under his jurisdiction as a field man, Eastern Washington and Eastern Oregon and the entire states of Idaho and Montana. On May 15, 1907, he was elected assistant secretary and called into the head office, and in September, 1918, he was elected secretary, which position he has filled ever since. He has also been secretary of the Home Fire and Marine Insurance Company and Occidental Insurance Company since their organization.

Mr. Blanchard is fortunate in having a diversity of interests in many fields outside the insurance business. He is a lover of the out-of-doors and the beauties of nature, and greatly appreciates the privilege and joy of being able to lay down the reins of business under such favorable conditions and enjoy other things in life for which he has a great liking.

J. M. Lalor, president of the Lalor Electric & Engineering Company of San Francisco, who has returned to his home port after a tour of inspection of all manufacturing plants represented by his organization. Welcome back, Jerry!

Injured in an automobile accident recently, HARRY FOWDEN, Fireman's Fund Insurance Company head office employee, who has been in the service of the company for thirty-nine years, received an expression of regard from fellow "old timers" in the form of a bouquet of chrysanthemums and a fountain pen. The card which accompanied the remembrance was signed by twenty one officers and employees, all of whom have been with the company prior to 1906. Among the signatures, appeared those of J. B. Levison, president; Thomas M. Gardiner, treasurer; H. P. Blanchard, secretary; A. W. Follansbee, Jr., marine secretary; John S. French, assistant secretary; Leslie J. Haefner, assistant marine secretary; and Thomas F. Ryan, assistant secretary.

Obituary

LEWIS TAYLOR ROBINSON, engineer in charge of the general engineering laboratory of the General Electric Company, died suddenly from a heart attack at his home in Schenectady, November 3. He was 63 years old.

Dr. Robinson was a veteran electrical technician, one of the widest known electrical engineers in the profession, and for twelve years was the head of one of the principal laboratories of General Electric. He was born at Springfield, Massachusetts, October 20, 1868, and was educated in the public school of Lynn and Reading. When 17 years of age he started to work at the newly organized electrical plant established at Lynn by the Thomas-Houston Electric Company, and soon came under the eye of Professor Thomson and became his office assistant. Under the tutelage of Thomson, he at once became greatly interested in things scientific and electrical, and his aptitude and progress were such that within a short time he was placed in charge of the company's standardizing laboratory. In 1891 Robinson formed a partnership with George A. Whitmore for the establishment of a laboratory for electrical testing and calibration of instruments. In 1893 he joined the old Schuyler Electric Company which has been acquired by the newly formed General Electric Company, a year later going to the Central Electric and Foundry Company. In 1896 he went to Schenectady to take charge of the standardizing laboratory of the General Electric Company remaining with the firm until his death.

Dr. Robinson had about thirty patents in this country and was widely honored during his life as inventor, engineer, and musician. Music was his principal hobby. He was a member of many technical and engineering societies and served on many committees in connection with his work as head of the General Engineering Laboratory of the company.

CAPTAIN CHARLES F. RODIN of San Francisco died last month at the age of 72. He was born at sea in 1859, and retired from a mariner's life in 1906 to conduct a hotel in San Francisco. Captain Rodin had invented a safety device for ocean liners, which consisted of an air-tight compartment, equipped with radio and supplies which could be released as a life-raft when needed.

The death of CAPTAIN HARRY JOHNSON last month in San Francisco, at the age of 60 years, marked the passing of one of the best known of the old "watermen" of San Francisco; he was operator in the old days of a Whitehall boat. Captain Johnson was born in Holland and went to sea as apprentice boy at 11 years of age. After serving some time in windjammers he came ashore at New York as an able seaman, where he pulled a boat for Teddy Oxford, a famous boarding house master of those days. He came to San Francisco in the ship Abner Coburn, a shipmate being Captain Albert Bartlett, and sailed for some years out of San Francisco. He entered the launch business many years ago and was still active when he was seized with a sudden illness which caused his death. Captain Johnson figured in many exploits of rescue and adventure on San Francisco Bay and in many other ports on the Pacific, and he was greatly beloved by all the old timers on the waterfront.

Quips That Pass in the Night

Impossible

First Stranger (at the party): "Very dull, isn't it?"

Second: "Yes, very."

"Let's go home."

"I can't. I'm the host."

More than His Share

Rastus: "Sambo these sho' am hard times."

Sambo: "Boy, you certainly says somethin'. The wolf am acoming to mah door."

Rastus: "Wolf a-coming? Why man, the wolf done had puppies right on mah doorstep."

A Legal Answer!

He: "Would you marry a spendthrift?"

She: "How much has he got to spend?"

The dear old lady entered a drug store and looked doubtfully at the youthful clerk behind the counter.

"I suppose," she began, "that you are a properly qualified druggist?"

"Yes, madam."

"You have passed all the examinations?"

"Certainly."

"Never poisoned anybody by mistake?"

"Not to my knowledge."

"Very well, then," she replied, heaving a sigh of relief, and laying a coin on the counter, "you may give me a nickel's worth of cough drops."

Why Is It?

The agent drives it 400 miles while demonstrating and it's still a new car. Then you drive it home and it's a used car, worth $800 less.

Married Bliss

Crabflakes—Do you act toward your wife as you did before you married her?

Codpiece—Exactly. I remember just how I used to stand across the street and gaze at her shadow on the curtain, afraid to go in. And I act the same way now.

They carefully approached a railroad crossing. As usual he stopped, looked and listened. As usual, all he heard was the car behind him crashing into his gas tank.

Fish Diet

Willie: "Maw, if the baby was to eat tadpoles, would it give him a big bass voice like a frog?"

Mother: "Good gracious no. They'd kill him."

Willie: "Well they didn't, Maw."

A Whole Menagerie

Dickey: "My Dad is an Elk, a Lion, an Eagle and a Moose."

Mickey: "How much does it cost to see him?"

"Does your mother allow you to have two pieces of pie when you are at home, Willie?" asked his hostess.

"No, ma'am."

"Well, do you think she would like you to have two pieces here?"

"Oh, she wouldn't care," said Willie, confidently. "This isn't her pie."

Sad but True

Office Manager: "I'm afraid you are ignoring our efficiency system, Jones."

Jones: "Perhaps so, sir, but somebody has to get the work done."

Frightened Into It

"How long have you been working for this company?"

"Ever since they threatened to fire me."

All Balled Up

Counsel: Are you sure this is the man who stole your car?

Plaintiff: I was until the cross-examination. Now I don't know if I ever possessed a car.

A Dirty Dig

"Mommer, what becomes of an automobile when it gets too old to run any more?"

"Why, somebody sells it to your Pa, dearie, for a used car as good as new."

A Sophisticated Justice

Justice: "How did the accident happen?"

Stremic: "Why, I dimmed my lights and was hugging a curve."

Justice: "Yeah, that's how most accidents happen."

Wife—"Isn't it strange my best ideas come when I'm washing my hands?"

Husband—"Why don't you take a bath?"

You Bet!

A real executive is a man who can hand back a letter for a third retyping to a red headed stenographer.

Not Anxious

The preacher, at the end of a stirring address, shouted: "Stand up all those who want to go to Heaven!"

A quiet little man remained seated, and the preacher shouted at him: "Don't you want to go to heaven?"

In a thin voice the little one replied: "Not immediately."

Patron: "May I have some stationery?"

Hotel Clerk (haughtily): "Are you a guest of the house?"

Patron: "Heck, no, I'm paying $20 a day."

In Scotland a dead-end street is a street with a toll bridge at the end of it.

No Soup

The imperative colonel, while inspecting the army kitchen, stopped two soldiers who were carrying a soup kettle.

"Here you," he growled, "give me a taste of that."

The colonel was used to being obeyed and so he received the desired taste without question or explanation. Then he spat and sputtered.

"Good heavens, man! You don't call that stuff soup, do you?"

"No, sir," replied the soldier meekly, "It's dishwater we was emptyin', sir."

Hot Stuff

Two moonshiners were discussing the merits and strength of their products. "Ah makes ma licker so strong," declared one, "dat when you drink it, yo can done smell de cornfield whar de corn was grown."

"Humph, Nigger, dat ain't nothin'," was the contemptuous comeback. "Ah spilled a few drops of ma licker on ma wife's pansy patch an dem pansies turned to tiger lilies, yas, sah."

No Sale

The druggist was awakened long after midnight by the violent ringing of his doorbell. On looking out his window, he saw a young miss in evening clothes.

"What's the matter?" he cried, as he pulled on his dressing gown, "Somebody ill?"

"Oh no," she cried gayly, "but I'm at a dance close by and I've mislaid my rouge."

"Really?" asked the druggist softly, "Well, I'm sorry, but I never keep enough rouge in stock to cover a cheek like yours!"